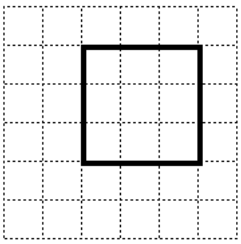
Year End Review

Chapter 1

1.1
1. Which of these numbers is a perfect square: 34, 36, 38, or 40?
2. Which of these numbers are square numbers: 48, 64, 57, 81?
3. Which 2 consecutive square numbers is 126 between?
4. Find the side length of a square with area 144 cm^2.
5. What is the area of this square?



6. Find the area of a square with side length 14 units.
7. A square book cover has area 25 square units.
   Find the perimeter of the book cover.
8. Which whole numbers between 67 and 141 are perfect squares?
9. I am a square number.
   The sum of my digits is 7.
   What square numbers might I be?

1.2
10. Find the square of 16.
11. Find 8^2.
12. Find a square root of 900.
13. Find $\sqrt{64}$.
14. List the factors of 70 in ascending order.
15. Find $9^2 + 5^2$.
16. Order from least to greatest: 5^2, 4^2, $\sqrt{289}$, 19
17. Find $\sqrt{1600}$.
18. Which perfect squares have square roots between 6 and 10?
19. What is a factor?

1.3
20. The side length of a square is $\sqrt{63}$ m. Find its area.
21. The area of a square is 65 cm^2. Find its side length.
22. Copy the square on grid paper.
    Find its area.
    Then write the side length of the square.

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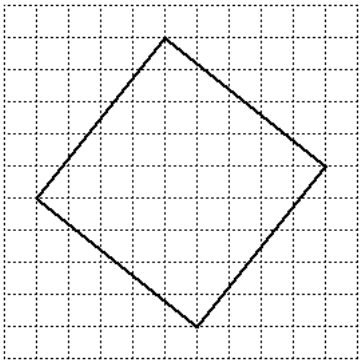
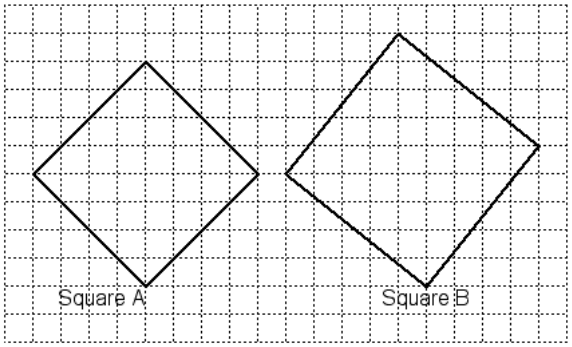
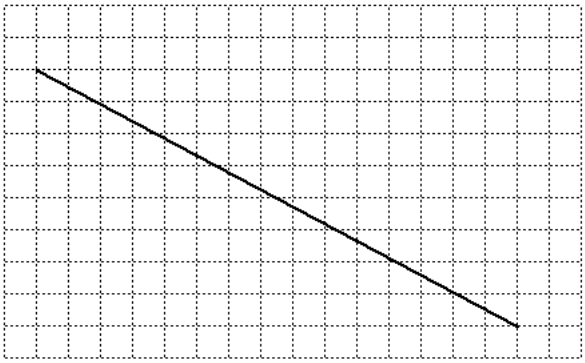
Find its area.
Then write the side length of the square.



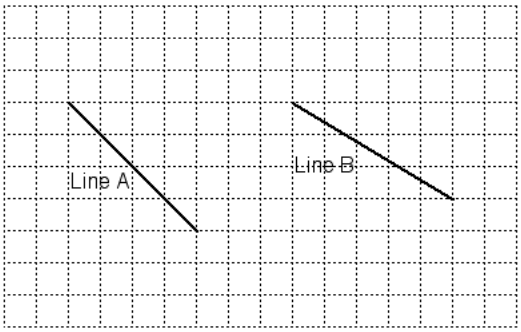
24. Copy each square on grid paper.
Which square has the greater area?



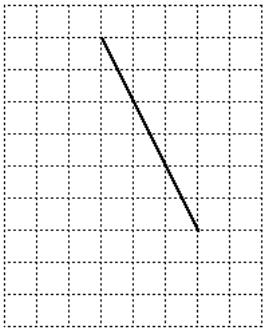
25. Copy the line segment on grid paper.
Draw a square on the line segment.
Find the area of the square and the length of the line segment.



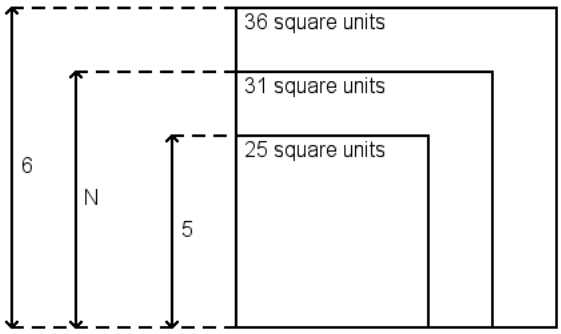
26. Without measuring, determine which line segment is shorter.



27. The side length of a square is $\sqrt{19}$ cm. Find its area.
28. The area of a square is 149 m. Find its side length.
29. Find $\sqrt{49}$.
30. Copy the line segment on grid paper.
    Draw a square on the line segment.
    Find the area of the square and the length of the line segment.



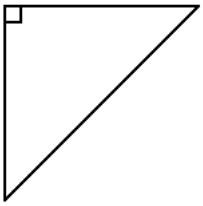
1.4 31. Between which 2 consecutive whole numbers is $\sqrt{15}$?
32. A square plot of land has area 140 m^2.
    Find the approximate side length of the plot of land.
    Give the answer to 2 decimal places.
33. Write N.
    Estimate the value of N to 1 decimal place.



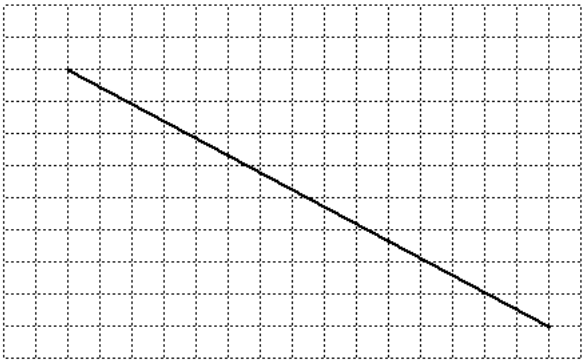
34. Which of the following square roots does not lie between 15 and 16?
$\sqrt{228}$, $\sqrt{252}$, $\sqrt{236}$, $\sqrt{221}$
35. Is 5 greater than, less than, or equal to $\sqrt{32}$?
36. What whole number is $\sqrt{75}$ closest to?
37. Find the approximate side length of a square with area 242 cm^2.
38. A square and a rectangle have the same area.
If the rectangle measures 19 m by 10 m, estimate the side length of the square.
Give your answer to the nearest metre.
39. Square A has area 10 cm^2.
Square B has area double that of square A.
What is the side length of square B? Give your answer to the nearest centimetre.
40. A square patio covers one-quarter of the area of a garden. The garden is 36 m by 36 m.
What are the dimensions of the patio?

1.5

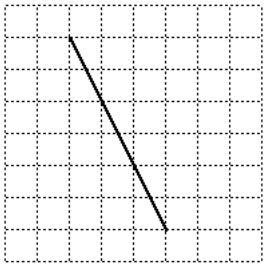
41. Label the hypotenuse on this right triangle.



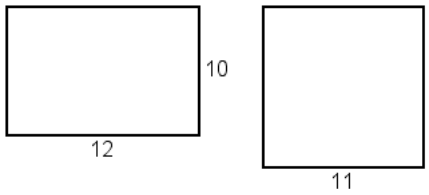
42. Write 89 as the sum of 2 perfect squares.
43. The length of the hypotenuse of a right triangle is $\sqrt{80}$ m.
The lengths of the legs are whole numbers of metres.
What are the lengths of the legs?
44. The length of one legs of a right triangle is 8 units and its hypotenuse is 17 units.
What is the length of the other leg?
Give your answer to 1 decimal place.
45. The hypotenuse of a right triangle is 13 cm.
The length of one of the legs is 7 cm.
Find the length of the other leg.
46. Use what you know about the Pythagorean Theorem.
Find the length of the line segment.



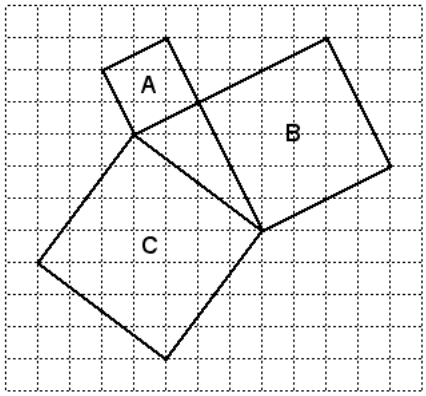
47. Use what you know about the Pythagorean Theorem.
Find the length of the line segment.
Give your answer to 1 decimal place.



48. Which has the longer diagonal, the rectangle or the square?

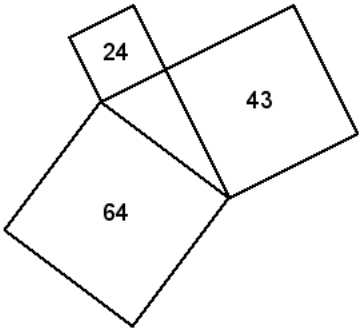


49. A square has area 169 cm^2. Determine the length of the sides and the length of the diagonal.
50. Find the area of each square.

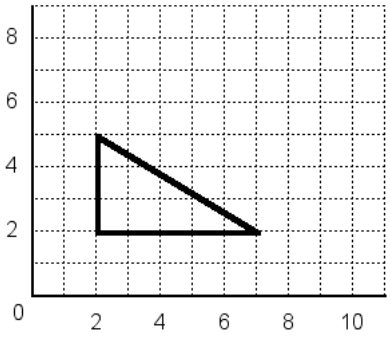


1.6 51. Two numbers in a Pythagorean triple are given. Find the third number.
8, 15
52. Is this set of numbers a Pythagorean triple? How do you know?
2, 21, 29
53. Which 3 of these numbers form a Pythagorean triple?
7, 15, 24, 25
54. Use these numbers to make sets of side lengths that form right triangles: $\sqrt{7}, \sqrt{5}, \sqrt{12}, \sqrt{14}, \sqrt{17}$
55. Determine whether a triangle with each set of side lengths is a right triangle.
a) 9 cm, 12, cm, 15 cm
b) 24 cm, 10 cm, 26 cm
c) 22 cm, 21, cm, 30 cm
d) 21 cm, 20 cm, 29 cm

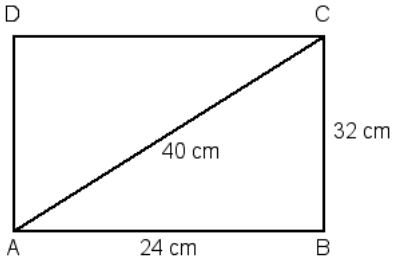
56. Determine whether a triangle with each set of side lengths is a right triangle.
    a) $\sqrt{7}$ cm, $\sqrt{23}$, cm, $\sqrt{30}$ cm
    b) $\sqrt{17}$ cm, $\sqrt{8}$ cm, $\sqrt{24}$ cm
    c) $\sqrt{15}$ cm, $\sqrt{8}$, cm, $\sqrt{23}$ cm
    d) $\sqrt{13}$ cm, $\sqrt{6}$ cm, $\sqrt{19}$ cm
57. The area, in square centimetres, of the square on each side of a triangle is given.
    Is the triangle a right triangle? How do you know?



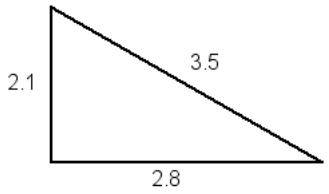
58. This triangle has side lengths 3 units, 5 units, and $\sqrt{34}$ units.
    Show that this triangle is a right triangle.



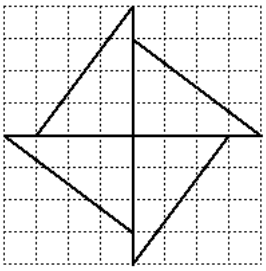
59. Kalsa wants to determine if her garden is a rectangle.
    The garden has side lengths 24 m and 10 m and diagonal length 26 m.
    Determine whether the garden is a rectangle.
60. Bennie thinks quadrilateral ABCD is a rectangle.
    Write the equation that could prove whether or not Bennie is correct.



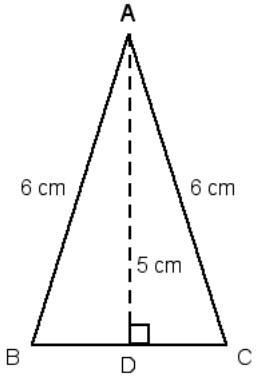
61. This is a Pythagorean triple: 6, 8, 10
    If the numbers represent the side lengths of a right triangle, what are the lengths of the legs?
    What is the length of the hypotenuse?
62. Determine whether this triangle is a right triangle.



1.7 63. This logo is made up of 4 congruent right triangles. Find the perimeter of the logo.

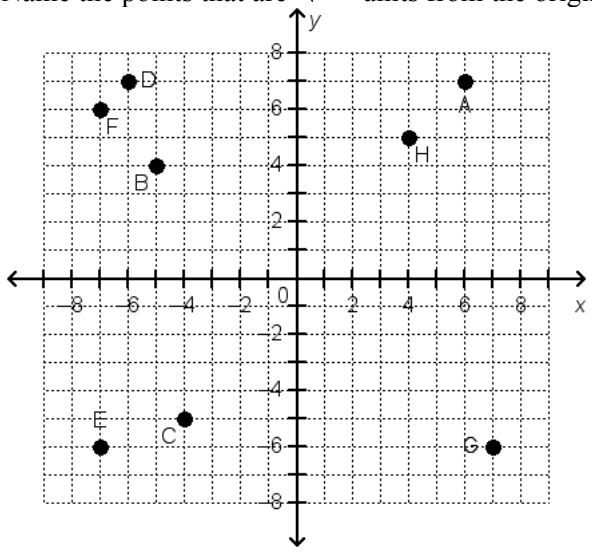


64. Triangle ABC is an isosceles triangle.
    Find the perimeter of the triangle.
    Give your answer to 1 decimal place.



65. Randall drew a right triangle with sides $\sqrt{24}$ cm and $\sqrt{16}$ cm.
    How long is the third side? Give your answer to 1 decimal place.
    Give 2 possible answers.
66. An airplane is 105 km due south of an airport. Another airplane is 80 km due west of the airport.
    How far apart are the planes? Give your answer to the nearest kilometre.
67. A rectangular carpet measures 6 m by 5 m.
    What is the distance between opposite corners? Give your answer to 1 decimal place.
68. The diagonal of a TV screen is 71 cm. The screen is 63 cm wide.
    What is the height of the screen? Give your answer to 1 decimal place.

69. A boat sails due south from a port at a steady speed of 9 km/h.
The wind blows the boat due west at a speed of 3 km/h.
How far is the boat from the port after 1 h?
Give your answer to 1 decimal place.
70. A rectangular sports field measures 100 m by 75 m.
How far will Wendy run if she runs diagonally across the field?
Give your answer to the nearest metre.
71. A line segment joins points P(–1, –7) and Q(7, 3). Determine the length of PQ to 1 decimal place.
72. Name the points that are $\sqrt{85}$ units from the origin.



73. ABCD is a parallelogram with $\angle ABD = 90°$. Find the length of BD.
Give the length to the nearest millimetre.

Chapter 2

2.1
1. Find the product of −14 and +5.
2. Find the product of −3 and −20.
3. Which products are negative?
   a) $(+4) \times (-23)$
   b) $(-7) \times (-18)$
   c) $(-4) \times (+23)$
   d) $(+4) \times (-7)$
4. ☐ This tile models +1. ■ This tile models –1.
   I have 10 sets of 8 black tiles. What integer do these tiles represent?
5. The product of 2 integers is −38. What can you say about the signs of the integers?
6. Jeff was draining a large oil tank. The oil level dropped at a steady rate of 7 cm each hour.
   Use integers to write the change in oil level after 4 h.
7. What integer should you multiply +5 by to get −15?
8. What integer should you multiply −6 by to get +36?
9. Evaluate. $(+5) \times (-5) \times (-10)$
10. Evaluate. $(+22) + (-6) \times (-5)$

2.2
11. Write (−13) + (−13) + (−13) + (−13) + (−13) as a product, then evaluate.

12. Evaluate. $(+37)+(-5)+(-5)+(-5)+(-5)$
13. Evaluate. $(+42)-(-9)-(-9)-(-9)-(-9)$
14. Replace with an integer to make the equation true.
    $\times(+12)=-48$
15. Replace with an integer to make the equation true.
    $(-7)\times$ $=+35$
16. Find the product of these 3 integers: +4, −4, +6
17. Which products are the same? What is the product?
    i) $(-6)(+12)$
    ii) $(+5)(-14)$
    iii) $(+8)(-9)$
    iv) $(+24)(-3)$
18. Write the next 2 terms in this pattern. Then write a pattern rule.
    +2, −6, +18, −54, ...
19. Write the next 3 terms in this pattern. Then write a pattern rule.
    −3, +9, −27, +81, ...
20. An arctic air current moved into the town of Iceville. The initial temperature was 29°C.
    The cold air caused the temperature to fall 4°C each hour.
    What was the temperature after 8 h?

2.3 21. Evaluate. $(+105)\div(-7)$
22. Evaluate. $(-990)\div(-90)$
23. Use the integers in this box. Write the division expressions that have a positive integer quotient.

+12	−3
+4	−10
−2	+5

24. Use the integers in this box. Write the division expressions that have a negative integer quotient.

+35	−5
−7	−24
−4	+6

25. Write a related multiplication equation for $(-16)\div(+2)=-8$.
26. Write a related multiplication equation for $(+63)\div(-7)=-9$.
27. Use the integers −18, +6, −3 to write 2 different division equations.
28. Write 2 related division equations for $(-3)\times(-7)=+21$.
29. The sum of the daily low temperatures over a period of 4 days was −40°C.
    What was the mean daily low temperature during this period?
30. The water level in a pool dropped 80 mm each hour. The total drop in water level was 480 mm.
    How long did it take for the water level to change?

2.4 31. Predict the sign of this quotient. $(-68)\div(+6)$
32. Which resulting integer is greater?
    $(+180)\div(-5)\times(+6)$ or $(+180)\times(-5)\div(+6)$?

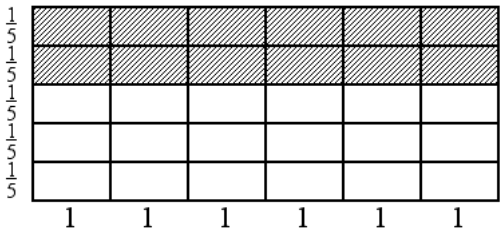
33. Write 2 related division equations for $(-5)\times(+17) = -85$.
34. Write 2 related division equations for $(-12)\times(-11) = +132$.
35. Replace $\square$ with an integer to make the equation true.
    $(+24) \div \square = -3$
36. Replace $\square$ with an integer to make the equation true.
    $\square \div (-12) = +2$
37. What integer should you divide 55 by to get a negative integer?
38. What integer should you divide −28 by to get a positive integer?
39. Calculate the mean of the bank deposits and withdrawals.
    +\$18, −\$5, −\$4, +\$17, +\$10, −\$6
40. Write the next 3 terms in this pattern. Then write a pattern rule.
    +4096, −1024, +256, ...

2.5

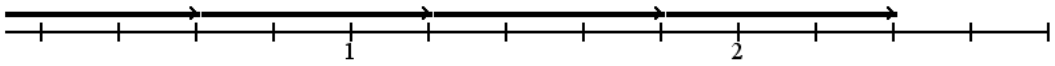
41. State which operation you do first.
    a) $15 + 5 \times 4 - 11$
    b) $15 \div 5 + 4$
42. Evaluate. $(5^2) - (5)^2$
43. Evaluate. $6(12 - 6) - 20$
44. Evaluate. $11 - 7 \times 9 - 7$
45. Evaluate. $10 \div 6 \times 15$
46. Evaluate. $\dfrac{(7)(9) - (-1)}{8}$
47. Evaluate. $\dfrac{-28}{(-5)(-6) - 2}$
48. Evaluate. $\dfrac{9(-8) \div 2(-3)}{2(-3)}$
49. Evaluate. $[(-4)(-4)(-4)(-4)] \div [(-4)(-4)(-4)] \times [(-4)(-4)] \div (-4)$
50. Evaluate. $[5 - 2(-9)] \times [(-2)(-9) - 23]$

Chapter 3

1. What is the product represented by the shaded area?

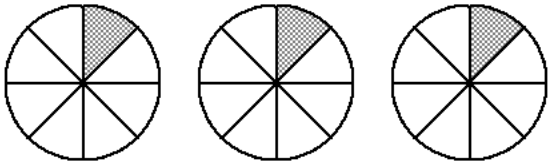


2. Write the multiplication equation represented by this number line.



3. Draw a picture to find each product.
   a) $2 \times \frac{3}{5}$
   b) $3 \times \frac{3}{4}$
   c) $4 \times \frac{5}{8}$

4. Draw a picture to find $5 \times \frac{3}{10}$.
5. Evaluate. $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4}$
6. Multiply. $10 \times \frac{5}{6}$
7. A cake recipe calls for $\frac{2}{5}$ cup of raisins, $\frac{2}{5}$ cup of currants, $\frac{2}{5}$ cup of sultanas, and $\frac{2}{5}$ cup of mixed peel.
   How much fruit is required for the cake?
8. Hilda ran for $\frac{1}{4}$ h on Monday and swam for $\frac{1}{4}$ h on Tuesday.
   She ran for $\frac{1}{4}$ on Wednesday, swam for $\frac{1}{4}$ h on Thursday, and ran for $\frac{1}{4}$ h on Friday.
   Write a multiplication statement for the total time Hilda spent running and swimming.
9. Write a multiplication equation for this diagram.

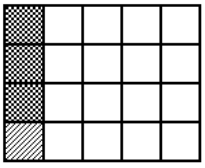


10. If it takes $\frac{3}{4}$ h to make a widget, how long will it take to make 17 widgets?

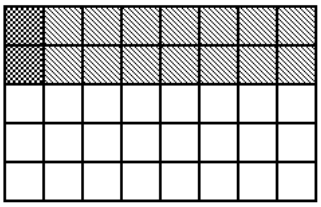
3.2 11. What are the dimensions of a rectangle that can be used to find this product?
$\frac{7}{8} \times \frac{10}{11}$

12. Draw a rectangle on grid paper to find this product. $\frac{7}{8} \times \frac{9}{10}$

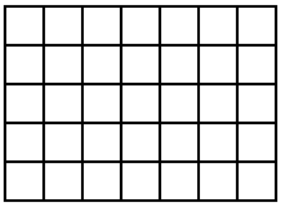
13. Write a multiplication equation represented by this diagram.



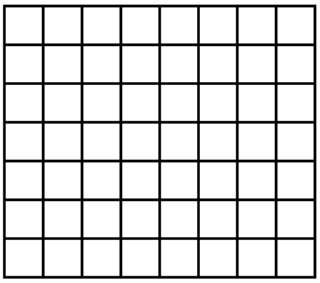
14. Write a multiplication equation represented by this diagram.



15. Shade the rectangle to find this product. $\frac{2}{5} \times \frac{3}{7}$



16. Shade the rectangle to find this product. $\frac{7}{8} \times \frac{2}{7}$



17. Find $\frac{2}{3}$ of $\frac{4}{7}$.

18. Multiply. $\frac{1}{6} \times \frac{3}{4}$

19. Multiply. $\frac{2}{5} \times \frac{5}{8}$

20. One-half of the Grade 8 students play on a soccer team. Of those who play on a soccer team, one-quarter are girls. What fraction of the Grade 8 students are the girls who play soccer?

3.3 21. Find the common factors of 18 and 27.

22. Write the reciprocal of $\frac{13}{15}$.

23. Find this product. $\frac{3}{8} \times \frac{20}{21}$

24. Simplify first. Then multiply. $\frac{24}{33} \times \frac{77}{84}$

25. Multiply: $\frac{7}{8} \times \frac{9}{7} \times \frac{8}{9}$

26. Elena spent $\frac{2}{3}$ of $\frac{5}{8}$ of her allowance on new shoes.
What fraction of her total allowance did Elena have left?

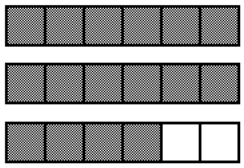
27. Replace $\square$ with a whole number to make the equation true.
$\frac{2}{\square} \times \frac{4}{5} = \frac{8}{15}$

28. Replace $\square$ with a whole number to make the equation true.
$\frac{\square}{3} \times \frac{5}{8} = \frac{5}{12}$

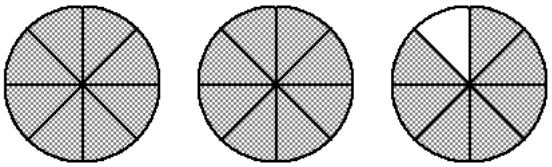
29. Evaluate. $\sqrt{\frac{25}{36}}$

30. There are 60 students in Grade 8 and $\frac{2}{3}$ of them applied to go on a trip to a science museum.
Of those who applied, $\frac{1}{4}$ went. How many students went to the science museum?

3.4 31. Write the mixed number and the improper fraction represented by this picture.



32. Write the mixed number and the improper fraction represented by this picture.



33. Find $\frac{1}{4}$ of $2\frac{2}{5}$.

34. Multiply. $4\frac{4}{5} \times 1\frac{7}{8}$

35. Multiply $3\frac{2}{3} \times 3\frac{1}{2}$. Write the product as an improper fraction and a mixed number.

36. Match each improper fraction with the corresponding mixed number.

a) $\frac{28}{16}$ i) $1\frac{1}{4}$

b) $\frac{26}{16}$ ii) $1\frac{1}{2}$

c) $\frac{20}{16}$ iii) $1\frac{3}{4}$

d) $\frac{24}{16}$

iv) $1\frac{3}{8}$

v) $1\frac{5}{8}$

37. Estimate each product.

a) $3\frac{1}{8} \times 5\frac{1}{8}$

b) $3\frac{1}{8} \times 5\frac{7}{8}$

c) $3\frac{7}{8} \times 5\frac{1}{8}$

d) $3\frac{7}{8} \times 5\frac{7}{8}$

38. A western Canadian restaurant lists the prices on its menu in fractions of a dollar.

Three friends each ordered a veggie burger for $7\frac{3}{4}$ dollars.

What was the total bill before taxes for the veggie burgers?

39. The Dugdales family went camping and it took $7\frac{1}{2}$ h to drive to a camp site.

After camping, it took $2\frac{1}{2}$ times as long to drive home due to an accident on a major road.

How long did it take the Dugdales family to drive home?

40. It takes David $6\frac{1}{4}$ h to make a model. It takes Jenny $2\frac{1}{2}$ times as long to make another model.

How long does it take Jenny to make her model?

3.5 41. How many quarters are in 5?

42. Find this quotient. $\frac{4}{7} \div 3$

43. Find this quotient. $\frac{5}{9} \div 5$

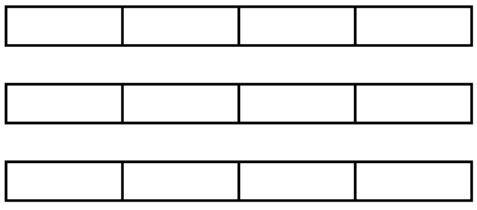
44. Find this quotient. $30 \div \frac{2}{3}$

45. It takes half an hour to construct a box. How many boxes can be made in 12 h?

46. A juice bottle holds $\frac{3}{5}$ L of juice. How many bottles can be filled from a tank containing 12 L of juice?

47. How many $\frac{3}{4}$-m pieces of ribbon can be cut from a roll of ribbon that is 60 m long?

48. Use the diagram to determine this quotient. $3 \div \frac{1}{4}$



Write the division equation.

49. Write the digits 3, 5, and 9 in the boxes to create as many division expressions as possible.

$\square \div \frac{\square}{\square}$

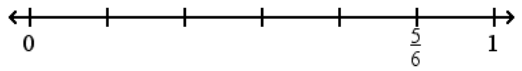
50. a) Write the digits 2, 10, and 12 in the boxes to create as many division expressions as possible.

$\square \div \frac{\square}{\square}$

b) Write the quotients for the expressions in part a).

3.6 51. Write the reciprocal of $2\frac{3}{4}$.

52. Use the number line to find this quotient. $\frac{5}{6} \div \frac{1}{2}$



53. Divide. $\frac{9}{13} \div \frac{7}{13}$

54. Divide $\frac{12}{13}$ by its reciprocal.

55. Find this quotient. $\frac{13}{15} \div \frac{2}{3}$

56. Use multiplication to find this quotient. $\frac{5}{7} \div \frac{3}{5}$

57. Use common denominators to find this quotient. $\frac{7}{12} \div \frac{2}{3}$

58. A rope is $\frac{19}{24}$-m long. How many $\frac{1}{6}$ m pieces can be cut from this rope?

59. Dorina can ice a cake in $\frac{1}{6}$ h. How many cakes can she ice in $\frac{5}{6}$ h?

60. Divide: $\frac{49}{51} \div \frac{14}{17}$

3.7 61. Write $3\frac{4}{7}$ as an improper fraction.

62. Write $\frac{41}{4}$ as a mixed number.

63. Match each mixed number with the corresponding improper fraction.

a)	$3\frac{1}{8}$	i)	$\frac{28}{8}$
b)	$3\frac{1}{2}$	ii)	$\frac{30}{8}$
c)	$3\frac{3}{4}$	iii)	$\frac{25}{8}$
d)	$3\frac{1}{4}$	iv)	$\frac{26}{8}$

64. Use common denominators to find the quotient of $3\frac{3}{5}$ divided by $2\frac{1}{10}$.

65. Use multiplication to find this quotient. $2\frac{2}{5} \div 3\frac{3}{4}$

66. Find this quotient. $3\frac{7}{9} \div 1\frac{5}{12}$

67. It takes Rhonda $13\frac{1}{2}$ h to build a model. She worked on her model for $2\frac{1}{4}$ h each evening.
How many evenings does it take her to finish her model?

68. A recipe for chocolate chip cookies calls for $1\frac{1}{4}$ cups of chocolate chips.
If Eileen has $5\frac{5}{8}$ cups of chips, how many batches of cookies can she make?

69. A piece of ribbon is $33\frac{1}{4}$ m long. How many $2\frac{3}{8}$-m pieces can be cut from this length of ribbon?

70. Evaluate. $2\frac{7}{10} \times 1\frac{1}{4} \div 3\frac{3}{8}$

3.8 71. Arlene ate $\frac{1}{5}$ and Eric ate $\frac{1}{6}$ of a box of candies.
What fraction of the box of candies was left?

72. Shane feeds his dog $\frac{3}{8}$ of a cup of food each day.
How much dog food does he need for 11 days' supply?

73. Ms. Cranston marked $\frac{1}{4}$ of her exam papers on Monday and $\frac{1}{6}$ of the remainder on Tuesday.
What fraction of the exam papers does she still have to mark?

74. A bag contains $3\frac{1}{3}$ kg of flour. Erise uses $1\frac{3}{4}$ kg to bake a batch of muffins.
How much flour is left?

75. How many $1\frac{1}{8}$ m pieces of ribbon can be cut from a roll of ribbon that is $13\frac{1}{2}$ m long?

76. A rectangular flower bed measures $3\frac{1}{5}$ m by $3\frac{3}{4}$ m. What is the area of the flower bed?

77. A school went on a ski trip. It took a bus $2\frac{1}{2}$ h to get to the ski resort.
At the end of the trip, it took the bus $2\frac{1}{2}$ times as long to return to the school due to a snow storm.
How long did it take the bus to travel from the resort back to the school?

78. Kirsty completed $4\frac{2}{3}$ laps in 42 min during training. Assume that Kirsty ran at a steady speed.
How long did she take for each lap?

79. How many pieces of ribbon, each $1\frac{3}{4}$ m long, can be cut from $8\frac{3}{4}$ m of ribbon?

80. Alison baked 9 dozen cookies for a charity bake sale. Benny baked half the amount Alison baked and Paula baked twice as many as Alison. How many dozen of cookies were baked?

3.9 81. Evaluate. $\frac{7}{8} \times \frac{11}{14} \times \frac{8}{13} \div \frac{22}{39}$

82. Evaluate. $\frac{2}{3} + \frac{5}{6} \times \left(\frac{4}{9} \div \frac{8}{9} \right)$

83. Evaluate. $\frac{7}{8} + \left(\frac{3}{4} - \frac{1}{8} \right) \times \frac{4}{5}$

84. Evaluate. $\frac{4}{5} \times \left(\frac{1}{2} + \frac{1}{3} \right) \div \frac{5}{6}$

85. Evaluate. $\frac{5}{4} \times \frac{2}{3} - \frac{1}{6} \div \frac{2}{3}$

86. Evaluate. $3\frac{3}{4} - 1\frac{1}{3} \times 1\frac{1}{2}$

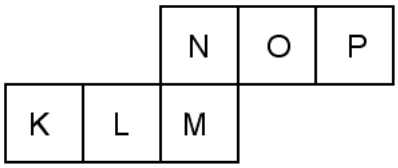
87. Evaluate. $3\frac{1}{2} + 2\frac{1}{2} \div \frac{4}{5}$

88. Evaluate. $\frac{5}{6} \div \frac{3}{2} + \frac{2}{3} \times \left(\frac{6}{5} - \frac{5}{6} \right)$

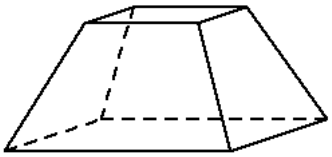
89. Evaluate. $\left(\frac{9}{8} \right)^3 \div \left(\frac{18}{24} \right)^2$

Chapter 4

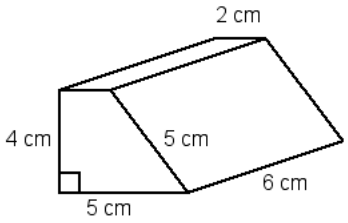
4.1 1. Is this diagram a net for a cube? If so, name the opposite faces.



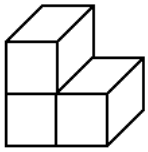
2. Draw a net for a cube and label the faces A, B, C, D, E, and F. When the cube is made, face A will be opposite face F, face B will be opposite face E, and face C will be opposite face D.
3. This diagram shows an object with 6 faces. The top and bottom are squares. The 4 sides are identical trapezoids. Sketch a net for this object.



4. Draw a net for this object.

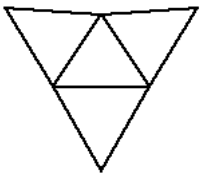


5. This object is built using 3 linking cubes. Draw a net of the object.

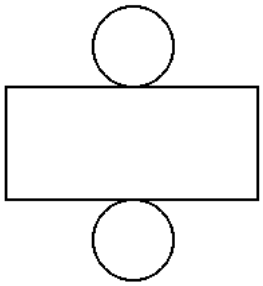


6. What shapes do you need to make a hexagonal prism?
7. What shapes do you need to make an octagonal pyramid?
8. Draw three different nets of a cube.
9. A regular octagon is a polygon with 8 equal sides and 8 equal angles. Describe the shapes you would use to construct a net of each object.
   a) an octagonal prism
   b) an octagonal pyramid
10. Sketch a net for each object.
    a) a closed cylinder
    b) an open cylinder

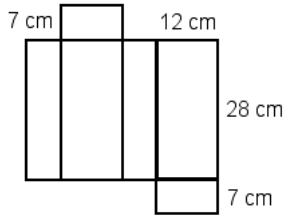
4.2 11. Name the polyhedron that can be made from this net.



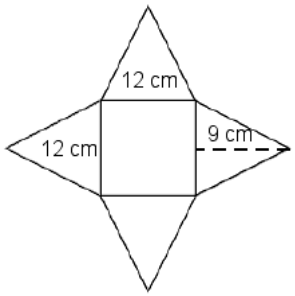
12. Name the object that can be made from this net. Is this object a polyhedron? Explain.



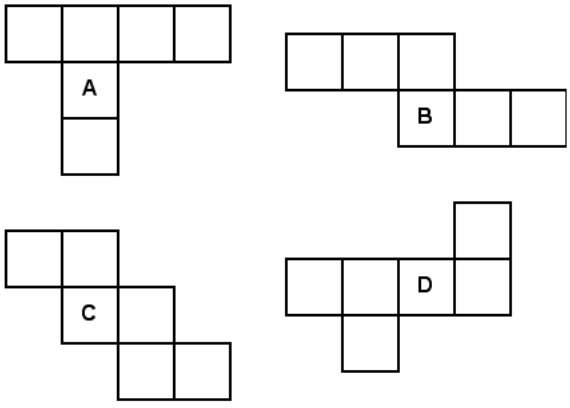
13. The net for a cereal box is shown. Describe the shape and dimensions of the box.



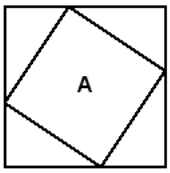
14. The net for a juice container is shown. Describe the shape and dimensions of the container.

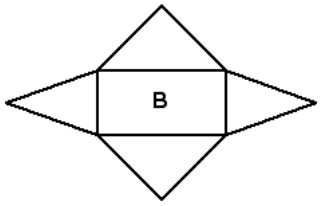


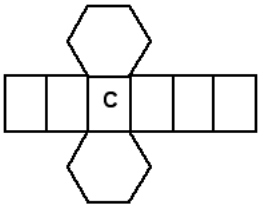
15. Which diagrams are nets of a cube?



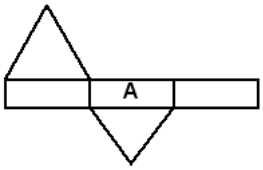
16. Which diagrams are nets of polyhedrons? For each net, identify the object that can be formed.

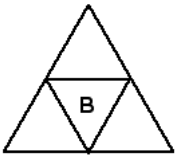


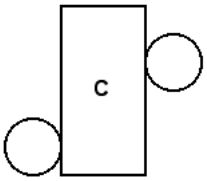




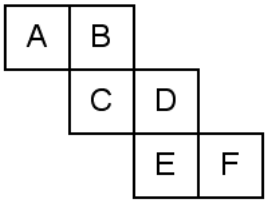
17. Identify the object that can be made from each net.



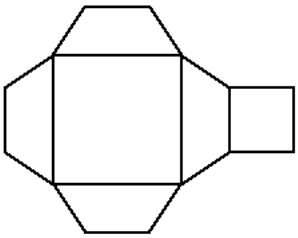




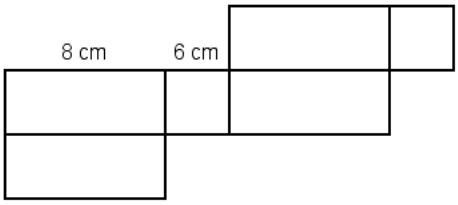
18. This diagram is a net of a cube. Name the opposite faces when the cube is made.



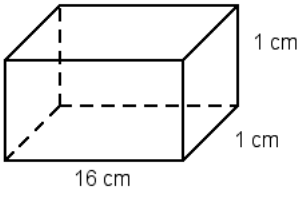
19. A net has of 2 hexagons and 6 rectangles. Identify the object that could be made from this net.
20. This diagram is the net of an object with 6 faces. Sketch the object.



4.3 21. This is the net of a right rectangular prism with square bases.
What is the surface area of the prism?

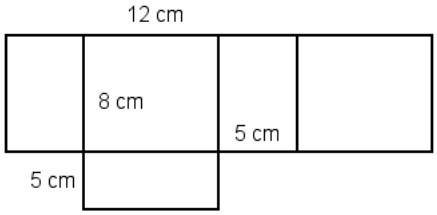


22. Find the surface area of this right rectangular prism.

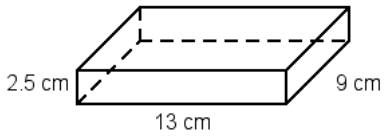


23. A right rectangular prism has length 10 m, width 7 m, and height 3 m.
Find the surface area of the prism.

24. An open box has the shape of a right rectangular prism. The net for the box is shown.
Find the area of the material required to make the box.



25. A jewelry store uses small boxes to store items they sell. This diagram shows one of the boxes.
Find the surface area of the box.



26. This table shows the dimensions of 3 boxes.

Object	Dimensions (cm)
Pizza box	$36 \times 36 \times 6$
Cereal box	$24 \times 17 \times 5$
Box of tea bags	$26 \times 15 \times 10$

a) What is the surface area of each box?
b) Which box has the least surface area?

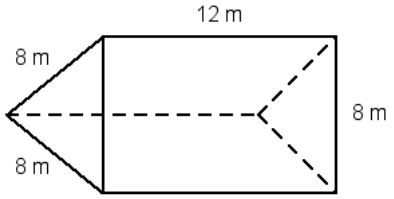
27. The surface area of a cube is 216 cm^2.
a) What is the surface area of one face of the cube?
b) What is the length of one edge of the cube?

28. Each of the length, width, and height of a right rectangular prism is doubled.
What happens to the surface area of the prism?

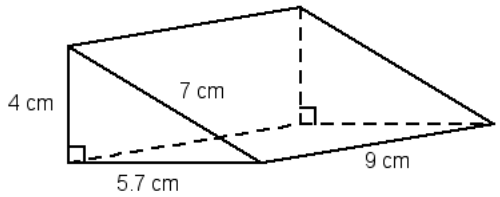
29. The length of one edge of a cube is 4 cm.
a) Find the surface area of the cube.
b) Find the new surface area if the edge length is multiplied by 3.
c) What is the ratio of the new surface area to the surface area in part a?

30. A right rectangular prism is made using 10 centimetre cubes.
a) What are the possible dimensions of the prisms?
b) What are the surface area of the prisms?

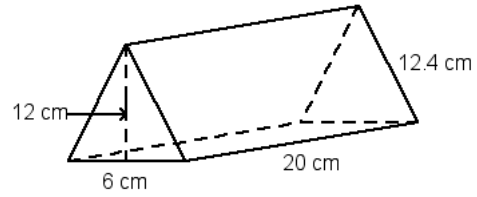
4.4 31. The base of this right triangular prism is an equilateral triangle.
Find the sum of the areas of the 3 rectangular faces.



32. Find the surface area of this right triangular prism.

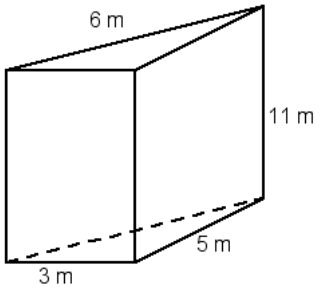


33. The 2 triangular faces of this prism are isosceles triangles with base length 6 cm and height 12 cm. Calculate the surface area of the prism.

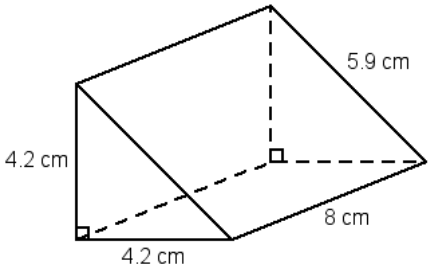


34. The area of a rectangular face of an equilateral triangular prism is 21 cm^2.
No dimension can be 1 cm. What are the possible whole-number dimensions of the edges?

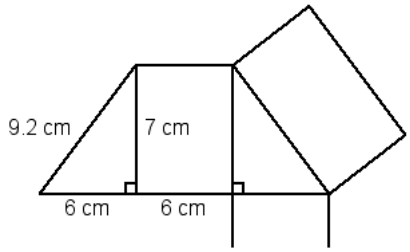
35. The area of the triangular top of this right triangular prism is 7.5 cm^2.
Find the surface area of the prism.



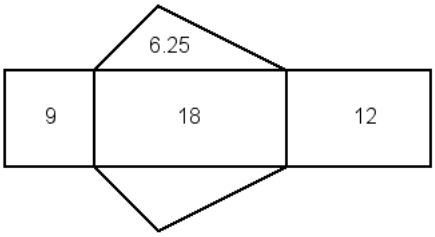
36. Find the surface area of this right rectangular prism.



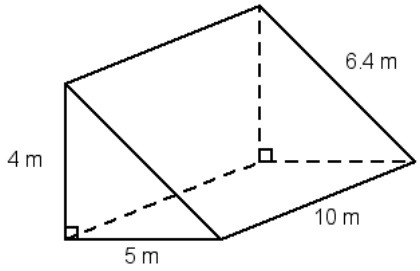
37. Calculate the surface area of this net of a right triangular prism.



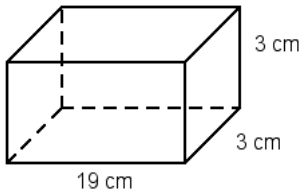
38. Here is the net of a right triangular prism. The area of each face, in square centimetres, is given.
Find the surface area of the prism formed from this net.



39. The 2 ends of a right triangular prism are equilateral triangles. Each has an area of 27 cm^2.
The total surface area of the prism is 390 cm^2. Calculate the area of each rectangular face.
40. Here is a right triangular prism.
    a) Find the surface area of the prism.
    b) If all the dimensions of the prism are doubled, what is the new surface area?
    c) How does this new surface area compare to the original surface area?



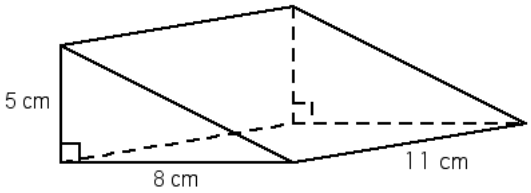
4.5 41. Find the volume of this square prism.



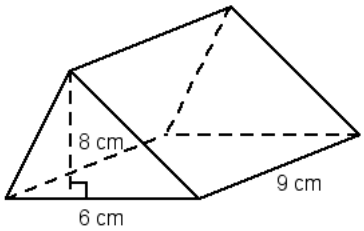
42. A rectangular prism has dimensions 14 m by 11 m by 7 m. Find the volume of the prism.
43. A right rectangular prism has a length 7.5 cm, width 3 cm, and height 4 cm. Find the volume and surface area of the prism.
44. A large slab of chocolate measures 32 cm by 72 cm by 3 cm.
    a) What is the volume of chocolate slab?
    b) The chocolate slab is shared equally among 36 students.
    How much chocolate does each student get?

45. Rectangular prism A measures 11 cm by 9 cm by 5 cm.
Rectangular prism B measures 16 cm by 5 cm by 6 cm.
Do the two prisms have the same volume? If not, which one has the greater volume? Explain.
46. A rectangular aquarium contains 7200 cm^3 of water.
The length of the aquarium is 24 cm and its width is 25 cm.
What is the depth of water in the aquarium?
47. A right rectangular prism has a volume of 144 cm^3. The length is 12 cm and the width is 4 cm.
a) Find the height of the prism.
b) Find the area of the smallest face.
48. The length of one edge of a cube is 5 cm.
a) Find the volume of the cube.
b) Find the new volume if the edge length is multiplied by 2.
c) What is the ratio of the new volume to the volume in part a?
49. If each of the length, width, and height of a rectangular prism is doubled, what happens to the volume?
50. A rectangular sheet of cardboard measures 20 cm by 16 cm.
To form the net of an open box, a 4-cm square is cut from each of the 4 corners of the cardboard.
What will be the volume of the box made?

4.6 51. Calculate the volume of this triangular prism.

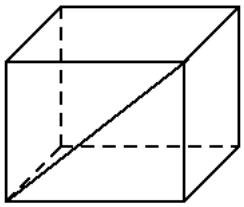


52. Calculate the volume of this triangular prism.

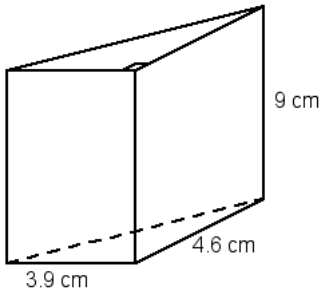


53. An equilateral triangular prism has a volume of 84 cm^3. The length of the prism is 12 cm.
Find the base area of the prism.

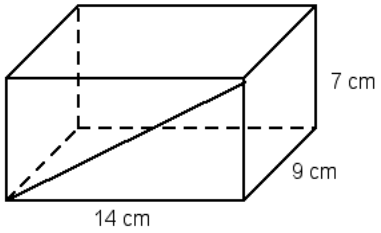
54. A right rectangular prism has a volume of 240 cm^3.
It is divided into 2 congruent triangular prisms along the diagonal shown.
Find the volume of each triangular prism.



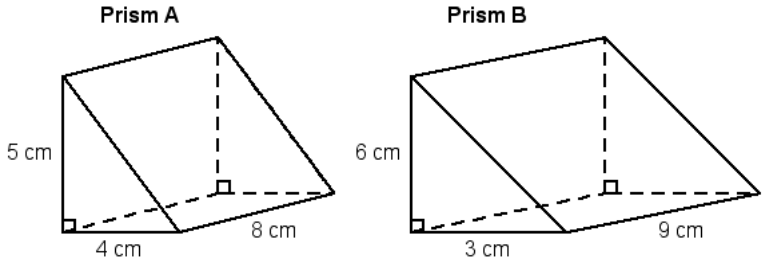
55. Calculate the volume of this triangular prism.



56. The triangular face of a right triangular prism has base 6 cm and height 5 cm.
The volume of the prism is 270 cm^3. Find the length of the prism.
57. The rectangular prism has dimensions 14 cm, 9 cm, and 7 cm.
It is divided into 2 congruent triangular prisms along the diagonal shown.
Find the volume of each triangular prism.



58. An ornamental fish pond is in the shape of a right triangular prism.
The base of the pond is a right isosceles triangle with each leg 6 m long.
If the pond contains 28.8 m^3 of water, what is the depth of water in the pond?
59. a) Find the volume of each right triangular prism.
b) Which prism has the greater volume?

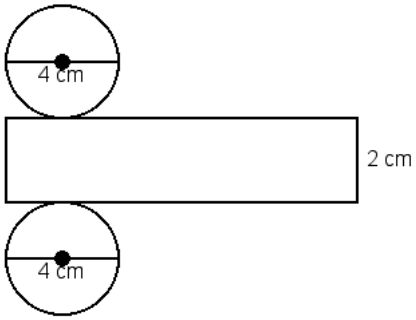


60. A right triangular prism has a volume of 8 cm^2.
Find all possible whole number values for A, the area of the base and l, the length of the prism.

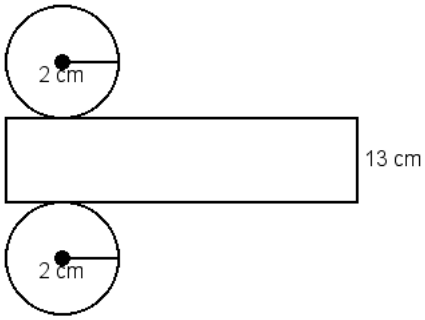
4.7 61. A circle has radius 18 cm. Find the circumference to the nearest centimetre.

62. A circle has diameter 17 cm. Find the circumference to the nearest centimetre.

63. Find the area of this net. Give your answer to the nearest square centimetre.



64. Find the area of this net. Give your answer to the nearest square centimetre.



65. Which cylinder has the greatest surface area?
Cylinder A: base radius 3 cm, length 5 cm
Cylinder B: base radius 4 cm, length 3 cm
Cylinder C: base radius 5 cm, length 1 cm
Cylinder D: base radius 3 cm, length 6 cm

66. A cylindrical tank has diameter 3.2 m and length 12.7 m.
What is the surface area of the tank, to 1 decimal place?

67. A cylindrical tube has diameter 12 cm and length 22 cm.
Calculate the curved surface area of the tube, to the nearest square centimetre.

68. A vase is made in the shape of an open cylinder with height 122 cm and diameter 11 cm.
The outside of the vase is to be painted.
What is the area to be painted, to the nearest square centimetre?

69. An open storage tank is cylindrical with height 13 m and diameter 22 m.
The outside curved surface area will be given 3 coats of paint.
Calculate, to the nearest square metre, the total area to be painted.

70. The curved surface area of a cylinder is 312 cm^2.
If the height of the cylinder is 13 cm, what is the circumference of the circular base?

4.8 71. The area of the base of a cylinder is 183 cm^2. The height of the cylinder is 14 cm.
Calculate the volume of the cylinder.

72. The radius of a cylinder is 18 cm and its height is 6 cm.
Calculate the volume of the cylinder, to the nearest tenth. Use $\pi = 3.14$.

73. The diameter of a cylinder is 15 m and its height is 5 m.
Calculate the volume of the cylinder to the nearest tenth. Use $\pi = 3.14$.

74. The diameter of a cylinder is 8 cm and its height is 14 cm.
Calculate the volume of the cylinder to the nearest cubic centimetre. Use $\pi = 3.14$.
75. There are 26 concrete cylindrical pillars in a stadium.
Each column has diameter 3.4 m and height 12 m.
Calculate the total volume of concrete in the pillars, to the nearest cubic metre. Use $\pi = 3.14$.
76. A core sample of soil is cylindrical. The length of the core is 400 mm and its diameter is 18 cm. Calculate the volume of soil in the core, to the nearest cubic centimetre. Use $\pi = 3.14$.
77. A well is cylindrical with diameter 40 cm and depth 60 m.
What volume of dirt, to the nearest tenth of a cubic metre, was removed to make this well?
78. Juice concentrate is poured into cylindrical cans with diameter 6 cm and height 11.6 cm.
A space of 1.5 cm is left at the top of each can to allow for expansion when the concentrate freezes.
What volume of concentrate, to the nearest millilitre, is poured into each can? Use $\pi = 3.14$.
79. The volume of a right cylinder is 400 cm^3.
What is the new volume if the radius is halved and the height is halved?
80. Which right cylinder has the greater volume?
Cylinder A: radius 4 cm, height 16 cm
Cylinder B: radius 16 cm, height 4 cm
Can you find the answer without using a calculator?

Chapter 5

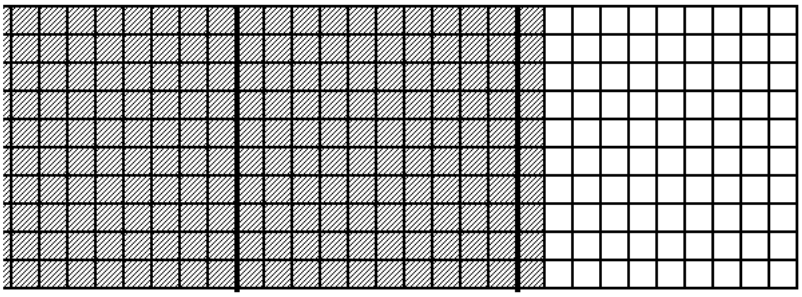
5.1 1. Write 15.5% as a fraction in simplest form and as a decimal.
2. Write $6\frac{3}{4}\%$ as a fraction in simplest form and as a decimal.
3. Write 0.54% as a fraction and as a decimal.
4. Write $\frac{18}{240}$ as a decimal and as a percent.
5. Rocky has read 12 of 24 books on his reading list. What percent of the books has he read?
6. A candy bar has a mass of 44 g and contains 11 g of sugar.
What percent by mass of the bar is sugar?
7. Write 0.365 as a fraction and as a percent.
8. Which decimals represent percents greater than 60%?

0.639	0.608	0.783
0.589	0.915	
0.493	0.193	0.853

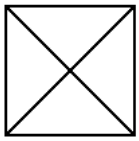
9. Abel used four colours to colour his hundred chart.
When finished, he said he coloured 25% red, 36% green, 13% yellow, and 31% blue.
Is Abel's claim possible? Explain.
10. A hundredths chart represents 1%. Each square represents $\frac{1}{100}\%$.
Damien shaded 40 squares. What percent did he shade?
Write your answer as a fraction and as a decimal.

5.2 11. A hundred chart represents 100%. Shade a hundred chart to show 180%.

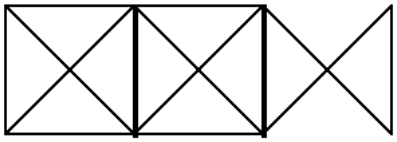
12. A hundred chart represents 100%. Write the percent represented by the shaded area.



13. This shape represents 100%.



What percent does this shape represent?



14. Write 2.76 as a fraction and as a percent.
15. Write 0.003 as a fraction and as a percent.
16. The cost price of a pair of hiking boots is $80. The selling price is 230% of the cost price.
    What is the selling price of the boots?
17. A charity run had 1650 people registered. Of these, about 0.8% finished in under 45 min.
    How many people completed the run in under 45 min?
18. The population of a small town was 4800.
    The population decreased by 5% one year then decreased by 15% the following year.
    What was the town's population at the end of each year?
19. Copy and complete this table.

Percent	Value
2000% of 320	
200% of 320	
20% of 320	
2% of 320	
0.2% of 320	

5.3

20. What percent of 200 is 69?
21. In a sample from a production line, 30 of 150 DVDs were faulty.
    What percent of the DVDs were faulty?
22. 130% of a number is 78. What is the number?
23. There are 23 000 workers in a factory. The management decides to reduce the workforce by 18%.
    How many workers will the factory lay off?
24. A technology company has 160 staff. It plans to expand and increase the number of employees by 16%. How many people will be employed after the expansion?

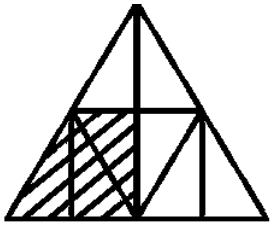
25. The population of a small town increased from 21 300 to 23 004.
    What was the percent increase in population?
26. A bike is on sale for $646. This is 15% off the regular price.
    What is the regular price of the bike?
27. The original selling price of a jacket was $122. At the end of the week the price was reduced by 10%.
    At the end of the second week, the price was further reduced by 10%.
    What was the selling price of the jacket after two weeks?
28. The attendance on the first night of the school concert was 375.
    The attendance on the second night was 420. What was the percent increase in attendance?
29. A square has side length 60 cm. Each side length of this square is increased by 10%.
    What is the percent increase in the perimeter and area of the square?

5.4

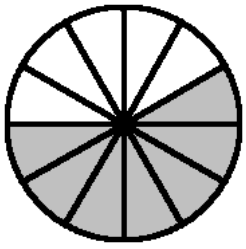
30. The price of a book is $51. Calculate the total sales tax on the book if PST is 7% and GST is 5%.
31. If GST is 5%, calculate the GST on a pair of running shoes priced at $71.48.
32. The price of a computer is reduced from $880 to $660. What is the percent decrease in price?
33. The price of a litre of gas went from 92¢ to $1.31. What was the percent increase in price?
34. The cost price of an article is $63. This represents 20% of the selling price.
    Calculate the selling price before taxes.
35. The price of a video camera is reduced by $21. This represents a discount of 16%.
    What is the regular price of the camera, including 12% taxes?
36. A house was purchased for $270 000.
    Four years later, the market value of the house had increased by 32%.
    What was the market value of the house after 4 years?
37. The cost of a hotel room at a resort is $105 per night plus 8% hotel tax and 5% tourist tax.
    How much tax would be paid on a room for 3 nights?
38. Which is the better deal?
    A: 20% off each DVD with a regular price of $40
    B: Two DVDs for $74
    Explain.
39. A sweater regularly priced at $135 is on sale at 15% off.
    How much would you pay for the sweater, including taxes of 12%?

5.5

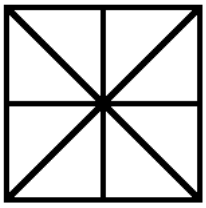
40. Write 3 different ratios using this diagram.



41. Write 3 different ratios using this diagram.



42. Shade the diagram to show the ratio 5:3 (shaded area : unshaded area).

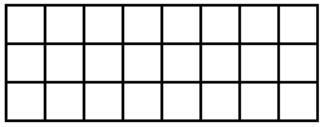


43. Marty has 3 white T-shirts, 2 coloured T-shirts, and 4 sweaters.
    What is the ratio of T-shirts to sweaters?
44. On a school trip, there are 11 boys, 13 girls, and 5 adults.
    What is the ratio of boys to girls? Students to adults?
45. The ratio of dogs to cats in an animal shelter is 9:14.
    Write the ratio of dogs to total number of dogs and cats.
46. A box contains 8 red balls, 15 green balls, and 11 yellow balls.
    Write each ratio.
    a) Red balls to yellow balls
    b) Green balls to total number of balls
    c) Yellow balls to non-yellow balls
47. You have 4 red cubes, 5 blue cubes, and 7 green cubes.
    Which sets of cubes could you use to show the ratio 7:9?
48. You have 5 circles and 7 triangles.
    What shapes could you remove to show the ratio 5:3?

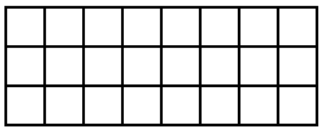
49. A student spends an average of 5 hours a day in school and 4 hours a week in math class.
    Write each ratio.
    a) hours of math to hours in school
    b) hours in school to hours in a day
50. There are 15 comic books and 17 novels on a bookshelf.
    a) What is the ratio of comic books to novels?
    b) What is the ratio of novels to books on the shelf?
    c) A student borrowed 3 comic books. What is the new ratio of comic books to books on the shelf?
51. There are 25 students in a class. The ratio of girls to boys is 12:13. Two girls left for another course.
    What is the new ratio of girls to boys? Boys to students in the class?

5.6

52. Write 2 ratios equivalent to the ratio 5:2.
53. Write 2 ratios equivalent to the ratio 8:10.
54. Which of these ratios are equivalent?
    16:18, 56:63, 17:34, 24:26, 40:45
55. Shade the grid to show a ratio of 5:7.



56. Shade the grid to show a ratio of 5:12.



57. The reference number for a textbook is QA1356V35.
What is the ratio of letters to numbers in simplest form?
58. Write the ratio of the value of a quarter to the value of a loonie two different ways.
59. A stamp collection contains 32 Canadian stamps, 20 United Kingdom stamps, and 12 Asian stamps. Write a ratio, in simplest form, to compare the stamps.
60. The ratio of hockey cards to baseball cards in Wayne's collection is 7 to 3.
If there are 100 hockey and baseball cards in the collection, how many are hockey cards?
61. In a class library, 3 out of 5 books are non-fiction.
If there are 45 books in the library, how many are fiction?
62. There were altogether 432 adults and students visiting the museum on Friday.
Of these, 252 were students. Write the ratio of adults to students in simplest form.
63. The ratio of boys to girls in a chess club is 3:7.
a) If there are 12 boys in the chess club, how many girls are there?
b) If 4 girls leave, what is the new ratio of boys to girls?

5.7

64. Which ratio is greater, 2:3 or 3:5?
65. In one locker, 5 out of 6 mitts are baseball mitts.
In another locker, 7 out of 8 mitts are baseball mitts.
Both lockers contain the same number of mitts.
Which locker has more baseball mitts?
66. In one apple drink, the ratio of apple juice to water is 5:3.
In another apple drink, the ratio of apple juice to water is 7:5.
Which drink has higher apple juice content?
67. The ratio ■:5, in simplest form, is greater than the ratio 5:7. Find the missing number.
68. A fruit punch calls for 4 cans of concentrate and 5 cans of water.
By mistake, Danielle uses 5 cans of concentrate.
Is the punch stronger or weaker? Explain.
69. Jake makes a punch using 4 cans of concentrate with 5 cans of water.
Roland makes another punch using 5 cans of concentrate and 7 cans of water.
Which punch is stronger? Explain.
70. Recipe A for a chicken broth calls for 4 chicken cubes and 5 cups of water.
Recipe B calls for 4 chicken cubes and 7 cups of water.
Which recipe gives a stronger chicken broth?
71. Class A has 56 books in its library. The ratio of fiction to non-fiction books is 9:5.
Class B has the same number of books and the ratio of fiction to non-fiction books is 4:3.
Which class has more fiction books?
72. The ratio of fiction to non-fiction books in Ms. Stark's class library is 3:2.
The ratio of fiction to non-fiction books in Mr. Bell's class is 7:3.
The two classes have the same number of books.
Which class has more fiction books?
73. In a basketball game, Steve made 17 of 20 foul shots and Ahmed made 13 of 15 foul shots.
Which player had the better score? Explain.
74. There are equal numbers of boys and girls in the library.
Every 3 out of 5 boys and every 4 out of 10 girls want to surf the net.
Do more boys than girls want to surf the net? Explain.

75. The Prairie Pirates has a win-to-loss ratio of 9:8. The Northern Lights has a win-to-loss ratio of 10:7.
Both teams played the same number of games. Which team has the better record? Explain.
76. Todd and Andrew have the same number of cards in their collection of hockey and baseball cards. Todd has 5 hockey cards for every 4 baseball cards. Andrew has 7 hockey cards for every 5 baseball cards. Who has more hockey cards? Explain.
77. In box A, the ratio of red cubes to total number of cubes is 5:11.
In box B, the ratio of red cubes to total number of cubes is 9:10.
If the total number of cubes is the same in each box, which box contains more red cubes? Explain.
78. Miguel made 5 of 12 free shots in his basketball game.
Nadia made 8 of 11 free shots in her basketball game.
Who played better? Explain.
79. Mr. Jones is planning to re-paint the classroom doors in yellow.
One shade of yellow requires 3 cans of white paint be mixed with 2 cans of yellow paint.
A second shade of yellow requires 5 cans of white paint be mixed with 3 cans of yellow paint.
Which mixture gives a darker shade of yellow? Explain.

5.8

80. Find the value of the variable.
$6{:}x = 9{:}17$
81. The ratio of win to loss is 5:4 for a sports team.
If the team played 90 games, how many games did the team win?
82. There are 48 students going on a school trip. The ratio of boys to girls is 3:5.
a) How many of the students are girls?
b) If 8 adults accompany the students, what is the ratio of adults to boys?
83. In a survey, 5 out of 6 nutritionists recommended hot oatmeal for breakfast.
If 300 nutritionists were surveyed, how many recommended hot oatmeal?
84. The length-to-width ratio of a rectangle is 17:14.
Find the length of a rectangle of width 98 cm.
85. The length of a car is 5.4 m. A model of the car has a length of 27 cm.
a) What is the width of the model car if the actual car is 2.1 m wide?
b) What is the height of the actual car if the height of the model car is 11 cm?
86. The table shows the volumes of water and colour concentrate needed to make a special shade of colour.

Water (mL)	9	18	27
Colour Concentrate (mL)	2	4	6

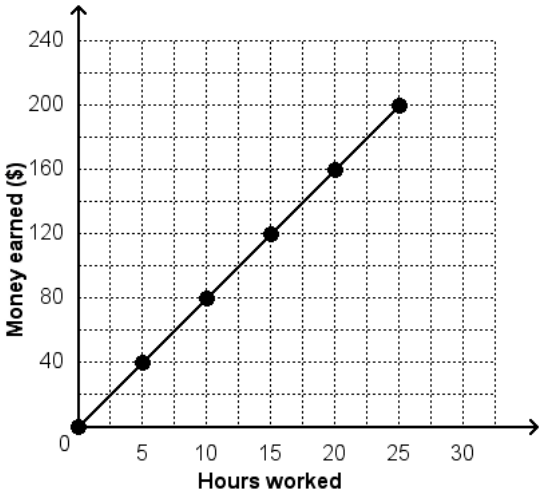
a) What is the ratio of water to colour concentrate?
b) What is the volume of water needed for 10 mL of colour concentrate?
c) How much colour concentrate is needed for 90 mL of water?
87. Model ships are built to a scale of 1:700.
a) A model ship is 18 cm long. What is the actual length of the ship?
b) A ship is 420 m long. What is the length of the model ship?
88. A cake recipe calls for 700 g flour, 300 g sultanas, 600 g raisins, and 300 g cherries.
a) What is the ratio of flour to fruit?
b) What is the ratio of sultanas and raisins to cherries?
c) How much fruit, to the nearest tenth of a kilogram, is required for 3 kg of flour?
89. Green paint and white paint are to be mixed in the ratio 2:3.
a) How many litres of green paint are required for 24 L of white paint?
b) How many litres of white paint are required for 14 L of green paint?
c) How many litres of each colour are required to make 30 L of mixture?
90. Bev can pack 7 boxes in the time it takes Liz to pack 4 boxes.
If 132 boxes are to be packed in the shortest time, how many should each person pack?

5.10 91. Complete this table on unit heart rates.

	Number of Heartbeats	Time (min)	Heart Rate (beats/min)
Chicken	600	2	
Elephant	120	4	
Human Adult	1440	20	
Cat	600	5	
Whale	1680	240	
Dog	270	3	

92. Sadiq types 110 words in 2 min. What is his unit rate of typing?
93. It takes Amina 8 min to stick 240 stamps on envelopes.
What is her unit rate of sticking stamps?
94. A plane travelled 2700 km in 9 h. How far did it travel in 1 h?
95. Elisa earned $78.00 for 12 h of work. What was her hourly rate of pay?
96. A hotel offers a special rate of $104.50 per night, including taxes.
How much does it cost for 6 nights of stay?
97. Corrie drove 176 km in 4 h. Geri drove 215 km in 5 h.
Who drove faster? Explain.
98. A soccer player scored 26 goals in 82 games.
What is the player's scoring rate in goals per game?
Round your answer to the nearest tenth.
99. In his Marathon of Hope, Terry Fox ran 5373 km in 143 days.
On average, how far did he run each day?
100. The West Coast Trail on Vancouver Island is a tough 75 km hike.
A group of hikers took 6 days to hike the trail.
What was the average distance, to the nearest tenth of a kilometre, covered each day?
101. Trenton can type 350 words in 5 min.
At this rate, how long will it take him to type an essay of 490 words?

102. The graph shows how much Kim earns for the hours she worked.
    a) How much does Kim earn for 1 h of work?
    b) What is Kim's hourly rate of pay?
    c) How much does Kim earn for working 30 h?



103. The cost of 6 m of ribbon is $21.
    a) What is the cost per metre?
    b) What would be the cost of 11 m of ribbon?
    c) How much ribbon could you buy for $28?
104. Marcus and Lisa went on holiday to England.
    The rate of exchange for their money was $2.35 Can to £1.
    a) How many English pounds would they get for $176.25 Can?
    b) Lisa bought a gift for £28. What is the value of the gift in Canadian dollars?
105. A marathon run covers about 42 km.
    a) Enid took 3.5 h to run a marathon. What was her average speed?
    b) Alicia ran at an average speed of 10 km/h. How long did it take her to complete the race?

5.10 106. Tanya scored 126 points in 52 games. What was her average number of points per game?
    Give your answer to 1 decimal place.
107. At Sean's mountain cabin, 10.4 cm of snow fell in 4 h. Assume the snow fell at a constant rate.
    a) How much snow fell in 1 h?
    b) How much snow fell between 8 p.m. and 7 a.m.?
108. Car A travels 496 km in 8 h.
    Car B travels 441 km in 7 h.
    Which car has the greater speed? Explain.
109. Bailey ran 5 laps of the track in 17 min. Aileen ran 6 laps in 21 min.
    Who, on average, ran faster? Explain.
110. Shazia earns $99.60 for working 12 h. Michelle earns $94.60 for working 11 h.
    Which job pays more? Explain.
111. Population density is measured as the number of people per square kilometre.
    What is the population density of a region that has 130 000 people in 1100 square kilometres of land?
112. The prices for comparable juice packs in different stores are:
    10 packs for $4.20
    20 packs for $6.00
    15 packs for $4.00
    Which is the best buy?

113. The table shows the prices for different numbers of pens.

Number of Pens	Cost
31	$4.65
23	$3.68
36	$5.04

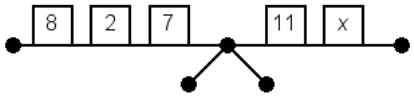
Which is the best buy?

114. A 2.4-kg bag of grass seed covers an area of 1200 m^2.
   a) What area will 1 kg of grass seed cover?
   b) How much grass seed is needed to cover an area of 800 m^2?

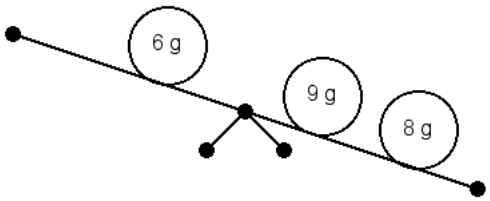
115. A package of 18 boxes of breakfast-size cereal costs $7.74.
Another package of 36 boxes of the same cereal costs $11.16.
Which is the better buy? Explain.

Chapter 6

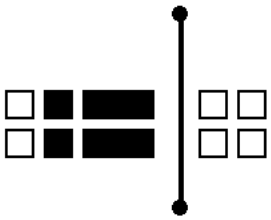
6.1 1. Use this balance-scales model to solve for x.



2. A set of balance scales has an unknown mass and a mass of 4 g in its left pan.
The scales are balanced by adding a mass of 21 g to the right pan.
Find the unknown mass.
3. What is the mass needed to balance these scales?



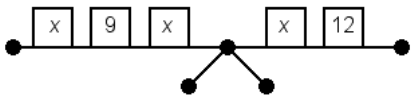
4. A white square represents +1, a black square represents –1, and a black rectangle represents $-x$.
Find the value of x.



5. In the left pan of a set of balance scales, there are 3 identical unknown masses and a mass of 5 g.
The scales are balanced by placing a mass of 20 g in the right pan.
Find each unknown mass.
6. Solve this equation. $-5x + 4 = 34$
7. Solve this equation. $7 + 4x = -13$
8. Match each equation in column 1 to to its solution in Column 2.

Column 1	**Column 2**
a) $12 - x = 9$	i) $x = -4$
b) $-3x = 12$	ii) $x = +4$
c) $8 - x = 11$	iii) $x = +3$
d) $-4x = -16$	iv) $x = -3$

9. Use this balance-scales model to solve for x.



10. a) Write an equation you could solve using balance scales or algebra tiles.
b) Write an equation you could solve using algebra tiles but not balance-scales.

6.2 11. Solve this equation. $9x + 16 = 43$
12. Solve this equation. $-37 = 8t + 3$
13. Solve this equation. $-6p + 9 = -33$
14. Solve this equation. $11 = 21 - 5w$

15. Verify that 5 is a solution of this equation: $6y - 7 = 23$
    Explain your method.
16. Sean paid \$81 to rent a boat to go fishing. The rental rate was \$25 plus \$8 per hour.
    For how many hours did Sean rent the boat?
    Write an equation, then solve the problem.
17. Jacqui has \$56 in her savings account. She saves \$25 each week.
    How long will it take before she has \$406 in her account?
    Write an equation, then solve the problem.
18. Ivan wants to buy a skateboard that costs \$45. He plans to save \$3 per week.
    How many weeks will it take him to save \$45?
    a) Write an equation you can use to find how many weeks it will take Ivan to save \$45.
    b) Solve the equation and answer the question.
19. Brandon wants to buy a stereo that costs \$200. He has saved \$90 and plans to save \$10 each week.
    a) Write an equation you can use to find how many weeks it will take Brandon to save enough money for the stereo.
    b) Solve the equation and solve the problem.
20. Miranda opened a checking account with \$560. She withdrew the same amount each week for 13 weeks. Her balance was then \$365.
    a) Write an equation you can use to find how much money Miranda withdrew each week.
    b) Solve the equation and solve the problem.

6.3 21. Solve this equation. $-2 = \frac{w}{-14}$

22. Solve this equation. $\frac{t}{-8} + 3 = 16$

23. Solve this equation. $-9 + \frac{y}{5} = 8$

24. Solve this equation. $\frac{x}{6} + \frac{13}{6} = 8$

25. Solve this equation. $\frac{x}{6} = \frac{9}{3}$

26. Which value, 4, 6, or 8, is the correct solution to the equation $\frac{x}{2} - 7 = -5$? Explain.

27. Write an equation for this sentence, then solve the equation.
    A number divided by -7 is -8.
28. Write an equation for this sentence, then solve the equation.
    When 7 is subtracted from a number divided by 3, the result is 14.
29. Write an equation for this sentence, then solve the equation.
    When a number divided by 5 is subtracted from 13, the result is 8.
30. Write an equation for this sentence, then solve the equation.
    When a number divided by 7 is subtracted from 2, the result is 0.

6.4 31. Expand. $-11(6 + z)$

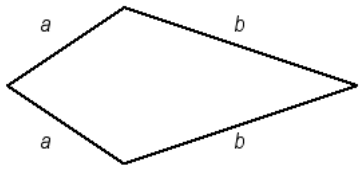
32. Expand. $-5(-x - 9)$

33. Which pairs of expressions are equivalent?
    a) $9(q + 2)$ and $9q + 2$
    b) $7(t + 5)$ and $7t + 35$
    c) $8(y + 3)$ and $8y + 11$
    d) $9(x + 5)$ and $9x + 45$

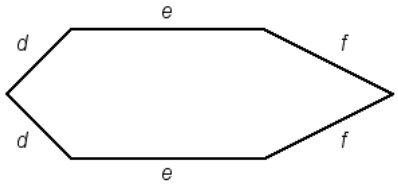
34. Match each expression in Column 1 with an equivalent expression in Column 2.

Column 1	**Column 2**
a) $-3(5-x)$	i) $-15-3x$
b) $3(-5-x)$	ii) $15+3x$
c) $-3(-5+x)$	iii) $15-3x$
d) $3(5+x)$	iv) $-15+3x$

35. A soccer team consists of 14 players. Each player needs a soccer stripe and a pair of team socks. A soccer stripe costs $32 and a pair of socks costs $17.
    a) Write 2 different expressions to find the cost of supplying the team with stripes and socks.
    b) Calculate the total cost.
36. Ms. Jones pays for 4 teens to go to a local theatre and supplies each with a snack. The admission cost for a teen is $11 and a snack costs $9.
    a) Write 2 different expressions to find the total cost of the outing.
    b) How much does Ms. Jones have to pay?
37. Write a formula for the perimeter, P, of this quadrilateral 2 different ways.

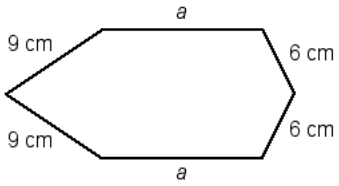


38. Write a formula for the perimeter, P, of this hexagon 2 different ways.



39. Expand. $5(13+x-6)$
40. Expand. $6(s-9+t)$

6.5 41. Solve this equation: $5(y-6)=10$
42. Solve this equation: $-2(p-6)=-14$
43. Solve this equation: $5(c+2)=21$
44. Solve this equation: $11=-4(s+2)$
45. Solve this equation: $3(t-5)=0$
46. The perimeter of a rectangle is 46 cm. The rectangle has length 13 cm.
    Write an equation to find the width, w, that involves the distributive property.
    Solve the equation.
47. This hexagon has a perimeter of 52 cm. What is the length of the side marked a?



    a) Write an equation to find the length of side a that involves the distributive property.
    b) Solve the equation and answer the question.

48. Saja and 10 friends went to a fair. The cost of admission was $8 per person.
They each bought an unlimited midway ride ticket.
The total cost of admission and ride tickets for Saja and her friends was $319.
What was the price of an unlimited ride ticket?
a) Write an equation to model the problem.
b) Solve the equation and answer the question.

49. Solve this equation: $4(13 + x - 7) = 16$

50. Solve this equation: $4(2x - 3) = 14$

6.6 51. The equation of a linear relation is $y = 7x - 5$. What is the value of y when $x = 2$?

52. The equation of a linear relation is $y = 5x + 9$. What is the value of x when $y = 34$?

53. Make a table of values for the relation $y = x - 4$ for $x = -4, -3, -2, -1, 0$.

54. Make a table of values for the relation $y = 4x + 3$ for $x = 1, 2, 3, 4$, and 5.

55. Make a table of values for the relation $y = 6 + 5x$ for $x = 0, 1, 2, 3$, and 4.

56. Make a table of values for the relation $y = -x + 8$ for integer values of x from –3 to 3.

57. The equation of a linear relation is $y = -3x + 8$. Which ordered pairs are NOT in the relation?
A(3, –1), B(7, –13), C(8, –16), D(9, –20)

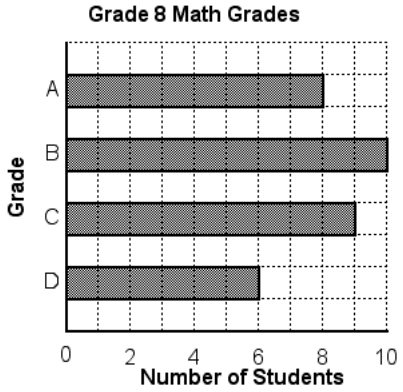
58. Iris has $240 in the bank and she withdraws $25 every week.
An equation for this relation is $c = 240 - 25w$, where c represents the amount of money, in dollars, in Iris' account and w represents the number of weeks.
How much does Iris have in her account after 4 weeks?

59. Harry has $110 in his savings account. He decides to save $15 every month to buy a bike.
An equation for this relation is $c = 110 + 15m$, where c represents the amount of money, in dollars, in his account and m represents the number of months.
How many months does it take Harry to have $185 in his account?

60. This table of values is for the linear relation with equation $y = b - x$, where b is a constant.
Find the value of b.

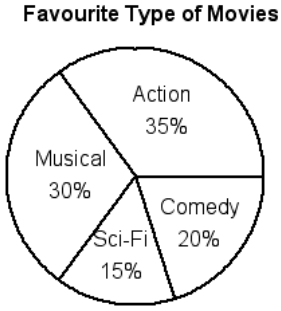
Chapter 7

7.1 1. This bar graph shows the final grades for Ms. Jackson's Grade 8 math class.



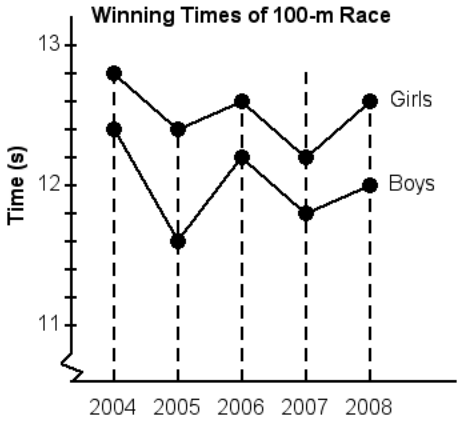
a) List 3 things you know from the graph.
b) List 1 thing you cannot tell from the graph.

2. This circle graph shows the favourite type of movies of a group of students.



a) List 3 things you know from the graph.
b) List 1 thing you cannot tell from the graph.

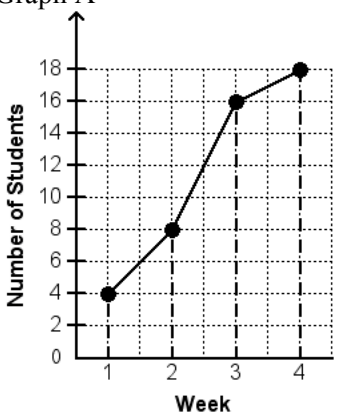
3. The graph shows the winning times of boys and girls for the inter-school 100-m race for 5 years.



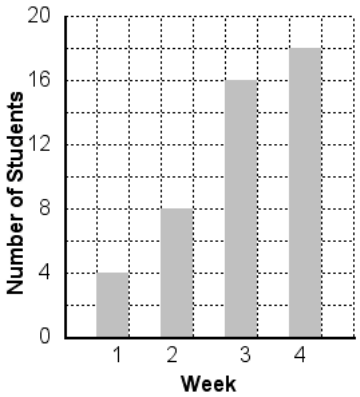
List 3 things you know from the graph.

4. These 2 graphs show the same data: the number of students attending a weekly math study session.
What are the strengths of each graph?

Graph A



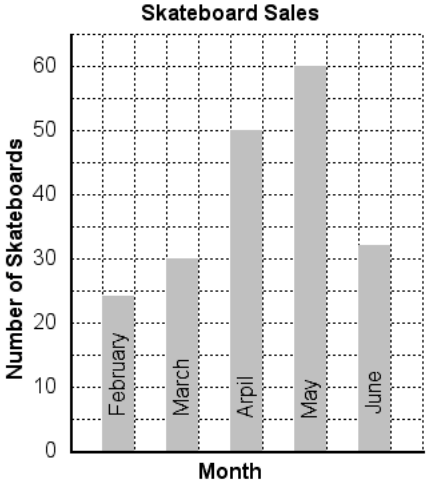
Graph B



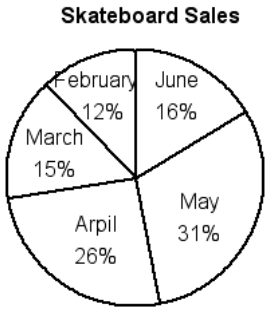
5. A group of students attending outdoor school has been asked to choose an activity from the list of hiking, kayaking, sailing, and rock climbing.
Which type of graph would you use to display the data? Justify your answer.

6. These 2 graphs show the same data: the sales of skateboards over a 5-month period.

Graph A



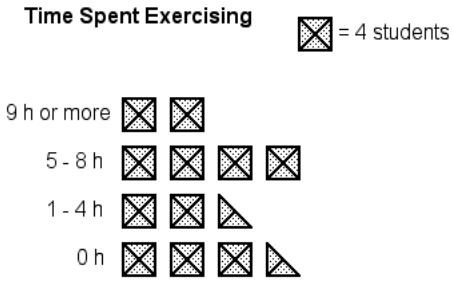
Graph B



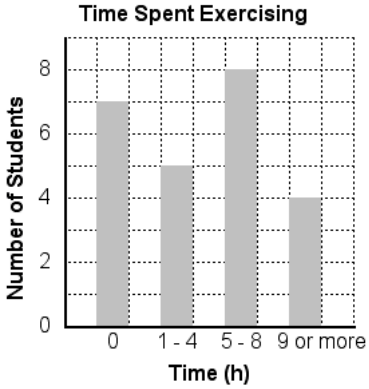
a) List 2 things you know from the bar graph in Graph A.
b) List 2 things you know from the circle graph in Graph B.
c) List 1 thing you cannot tell from each graph.

7. These 2 graphs show the same data: the number of hours per week a group of students spent exercising.

Graph A



Graph B



a) List 2 things you know from the pictograph in Graph A.
b) List 2 things you know from the bar graph in Graph B.
c) List 1 thing you cannot tell from each graph.

8. Match each description of data to the appropriate type of graph to display the data.

	Data		Graph
a)	The number of candy bars sold in 1 week by grade levels	i)	Line graph
b)	The ice cream bars of different flavours sold in 1 week	ii)	Circle graph
c)	The weekly sales of juice boxes over a period of 4 weeks	iii)	Pictograph
d)	The percent of each flavour of potato chips sold in 1 week	iv)	Bar graph

9. This table shows the weekly sales of T-shirts in a sports store.

Week	1	2	3	4	5	6
Number of T-shirts	18	24	31	38	45	58

What type of graph would be most appropriate to display the data? Justify your answer.

10. Three school teams compete in a monthly math competition.
This table shows the scores for each team over 4 months.

	January	**February**	**March**	**April**
School A	95%	88%	92%	90%
School B	90%	93%	90%	96%
School C	85%	90%	96%	92%

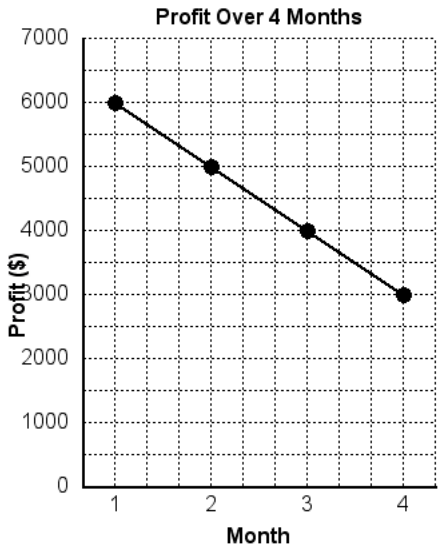
Which type of graph would be most appropriate to display the data? Justify your answer.

7.2 11. This table shows the profits for a company over a period of 4 months.

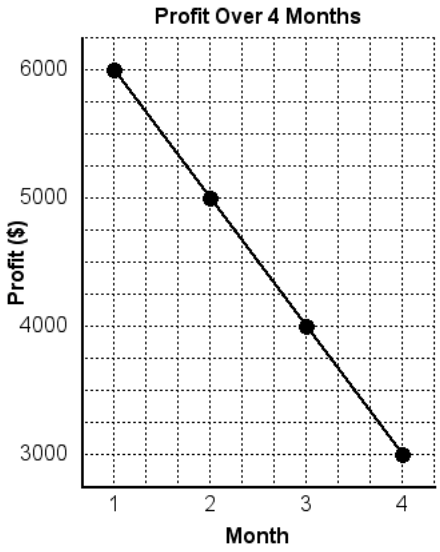
Month	1	2	3	4
Profit ($)	6000	5000	4000	3000

Which graph below would you use if you wanted the fall in profits to look small?

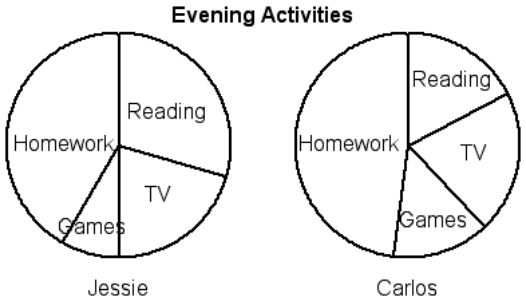
Graph A



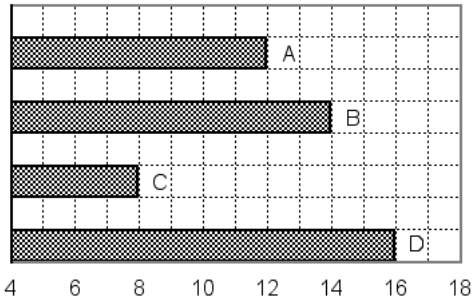
Graph B



12. These graphs show how 2 students spend their evenings.
Can you tell from the graphs which student spends more time on homework? Explain your answer.

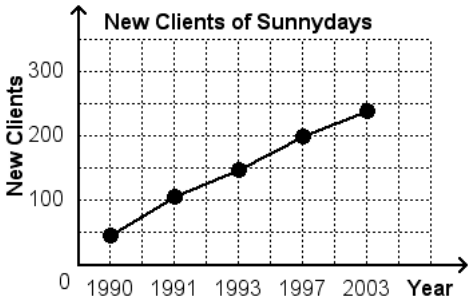


13. This graph shows the population, in thousands, of 4 towns.

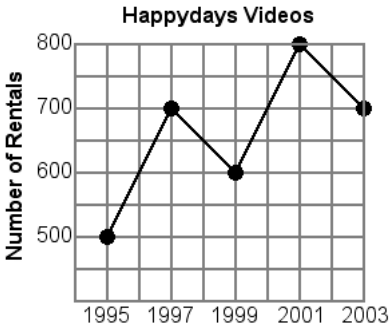


a) Which town appears to have about twice the population of Town C?
b) Which town actually has twice the population of Town C?
c) Explain why the graph is misleading.

14. This graph shows the number of new clients brought into Sunnydays Insurance Company. Why is the graph misleading?

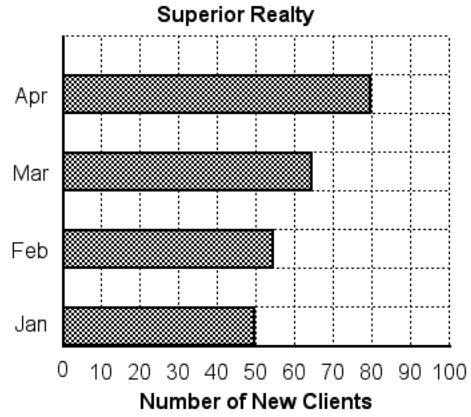


15. This graph shows the average number of rentals per day at Happydays Videos over several years. Draw a graph that shows the exact differences in the average rentals between years.

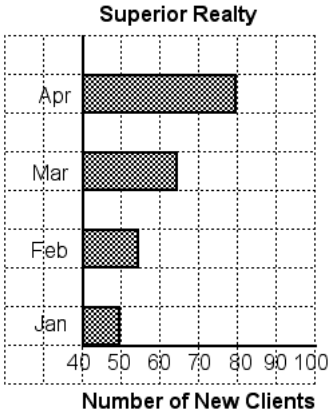


16. Both graphs represent the number of new clients signed up each month at Superior Realty.
Which graph is misleading? Why?

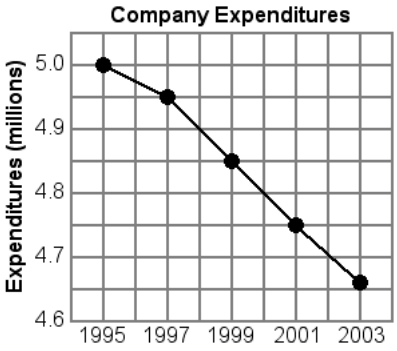
Graph A



Graph B

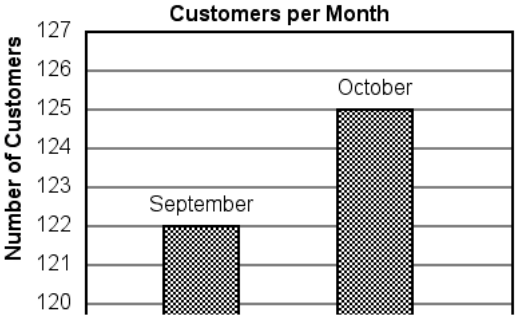


17. This graph shows the expenditures of a company over several years.



a) Why is this graph misleading?
b) Explain how the graph could be changed to present the data more accurately.

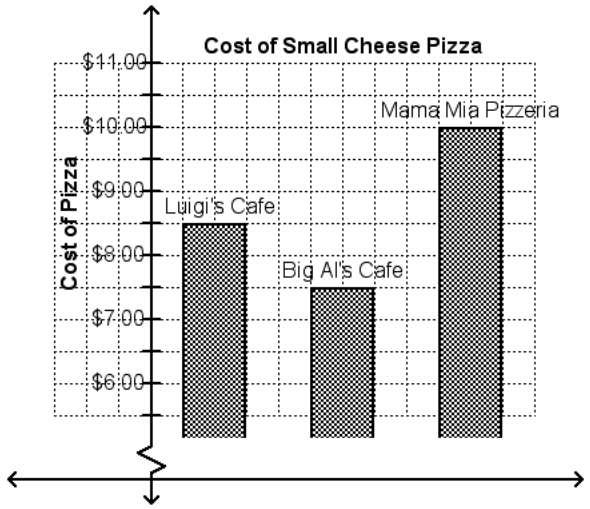
18. This graph shows the number of customers buying from a store in September and October.
How could you change the graph so that the difference in the number of customers between the 2 months does not seem so great?



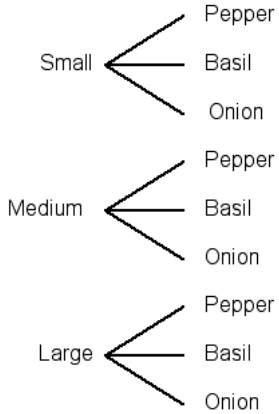
19. This table shows the weekly sales of books over a period of weeks.
Display the data in a graph that suggests book sales have increased dramatically.

Week	1	2	3	4
Number Sold	100	105	115	120

20. This graph shows the costs of a small cheese pizza at 3 different restaurants.
    a) Explain how the size of the bars gives a false impression about the cost of a pizza at different restaurants.
    b) Why might Big Al's Cafe use this misleading graph?



7.3 21. This tree diagram shows the choices of topping and size available at a pizza parlor.
How many possible combinations have pepper as a topping?

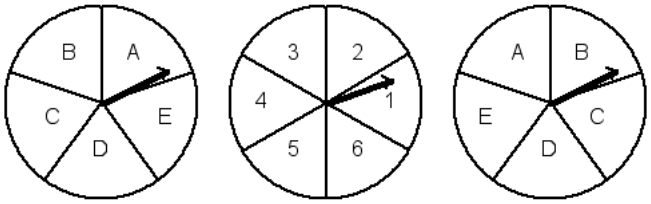


22. Two coins are tossed. What is the probability of tossing 2 tails?
23. Two regular 6-sided dice, each labelled 1 to 6, are rolled.
What is the probability of rolling 2 even numbers?
24. On Friday nights, a local diner serves 3 main entrees, each with a choice of vegetables.
Choices for entrees are beef, chicken, and fish.
Choices for vegetables are spinach, broccoli, and carrots.
How many possible dinners does the diner serve? List them.
25. At a pizza parlor, choices for pizza topping are Garlic, Onion, and Sausage, and choices for size are Mini and Giant. Draw a tree diagram that shows all possible one-topping pizzas.
26. Two regular 6-sided dice, each labelled 1 to 6, are rolled.
What is the probability of rolling 2 numbers that are the same?
27. A spinner is divided into 4 equal sectors of red, green, blue, and purple.
A regular 6-sided die labelled 1 to 6 is rolled and the pointer of the spinner is spun.
What is the probability of rolling an even number and the pointer landing on red?

28. A spinner is divided into 4 equal sectors of red, green, blue, and purple.
A regular 6-sided die labelled 1 to 6 is rolled and the pointer of the spinner is spun.
What is the probability of rolling a prime number and the pointer landing on purple?
29. A bag contains 5 red marbles, 3 blue marbles, and 4 yellow marbles.
A students removes 1 marble without looking, records the colour, then returns the marble to the bag.
The process is repeated. What is the probability of each outcome?
a) 2 red marbles
b) not a red marble, then not a yellow marble
30. An experiment consisted of rolling a regular 9-sided die labelled 1 to 9 and tossing a coin.
What is the probability of rolling a 7 and tossing a head?

7.4

31. A yellow die, a purple die, and a green die are rolled. Each is a regular 8-sided die labelled 1 to 8.
What is the probability of rolling a 4 on the yellow die, a 2 on the purple die, and a 7 on the green die?
32. Three spinners, each divided into equal sectors, are labelled as shown.
The pointer of each spinner is spun once.
What is the probability of the pointers landing on D of first spinner, an even number on the second spinner, and on B of the third spinner?

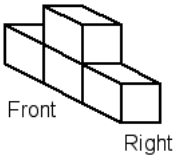


33. A gas station offers a lucky draw to customers.
Each time you spend more than $20 on gas, you can make a draw to win a prize.
The probability of winning a prize is $\frac{1}{12}$.
Suppose you buy gas 4 times. What is the probability of you winning a prize each time?
34. A set of 5 cards is numbered 1, 3, 5, 7, and 9. Another set of 5 cards is numbered 2, 4, 6, 8, and 10.
A card is picked at random from each set. What is the probability of each event?
a) The sum of the 2 numbers is even.
b) The sum of the 2 numbers is odd.
35. Jake has 3 coins. Two of the coins are regular but the third is a trick coin with 2 heads.
The 3 coins are tossed. What is the probability of tossing all heads?
36. There are 3 decks of standard playing cards. Each of 3 students picks a card at random from a deck.
What is the probability of each student picking a face card (Jack, Queen, King)?
37. Pedro, Elaine, and Hessna each has a standard deck of playing cards.
They each picks a card at random from his/her own deck.
What is the probability of Pedro picking a club, Elaine picking a red card, and Hessna picking an ace?
38. A spinner is divided into 4 equal sectors coloured red, blue, yellow, and green.
A regular 6-sided die is labelled 1 to 6.
Ronald spins the pointer on the spinner, rolls the die, and tosses a coin.
What is the probability of the pointer landing on green, rolling an even number, and tossing a tail?
39. A bag contains 8 red marbles and 2 blue marbles.
Leila draws a marble without looking, records the colour, then returns the marble to the bag.
This process is repeated 5 times. What is the probability that a blue marble is drawn each time?
40. The probability of a new-born puppy being male or female is 0.5.
What is the probability that a litter of 4 puppies would contain 2 males and 2 females?
Use coin tosses to simulate the problem. Give your answer as a fraction and as a percent.

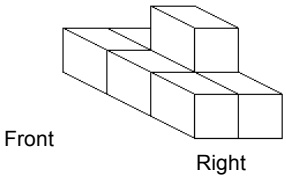
Chapter 8

8.1

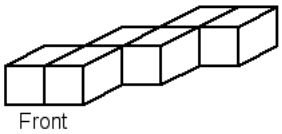
1. This object is made using linking cubes. Sketch the right side, front, and top views of the object.



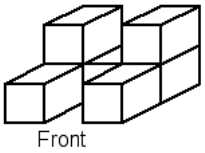
2. This object is made using linking cubes. Sketch the left side, front, and top views of the object.



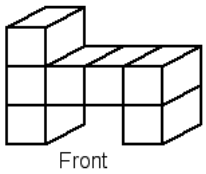
3. This object is made using 6 linking cubes. Sketch the front and side views of the object.



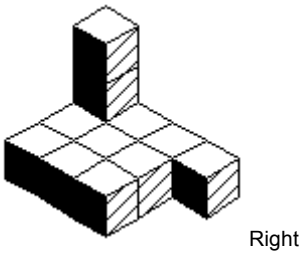
4. Use 7 linking cubes to make the letter H. Sketch the front and top views of the object.
5. This object is made using 7 linking cubes. Sketch the top, front, and right side views of the object.



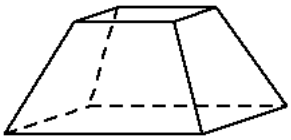
6. This object is made using 7 linking cubes. Sketch the top, front, and right side views of the object.



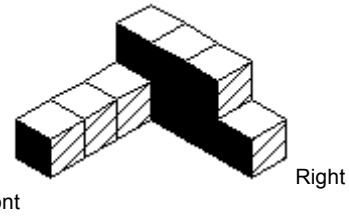
7. Sketch the front, top, and right side views of this object.



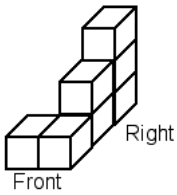
8. The top and bottom of this object are squares. Sketch the top and front views of the object.



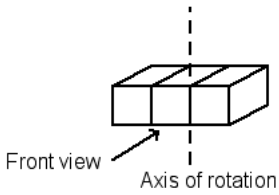
9. Sketch the front, left side, and back views of this object.



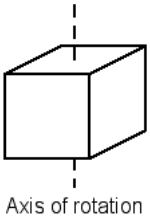
10. This object is made using linking cubes. Sketch the top, front, left side, and right side views of the object.



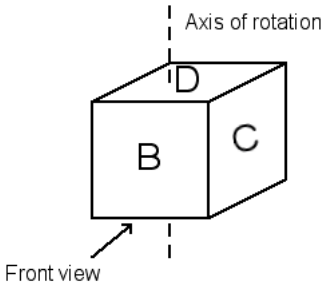
8.2 11. This object is built using 3 linking cubes.
It is given a horizontal rotation of 90° counterclockwise about the vertical axis shown.
Draw the top, left side, front, and right side views of the rotated object.



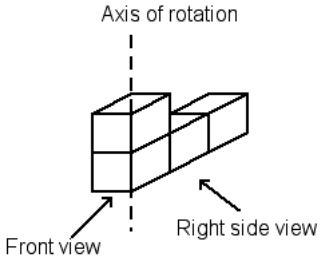
12. This cube is given a horizontal rotation of 90° clockwise about the vertical axis shown.
Draw the top, left side, and front views of the rotated cube.



13. This cube is given a rotation of 90° clockwise about the vertical axis shown.
Draw the top and front views of the rotated cube.

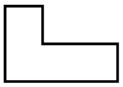


14. This object is built using 4 linking cubes.
It is given 2 different horizontal rotations about the vertical axis shown.



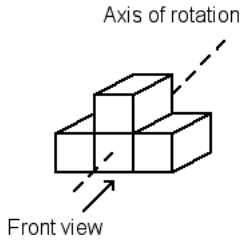
The front view of the object after each rotation is shown. Describe each rotation.

a)

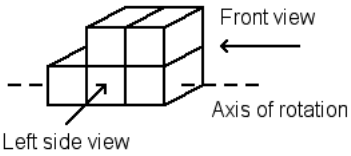


b)

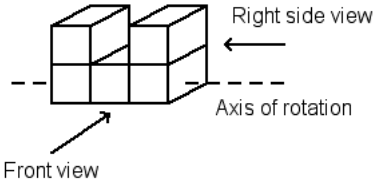
15. This object is given a vertical rotation of 90° clockwise about the horizontal axis shown.
Draw the top, left side, front, and right side views of the rotated object.



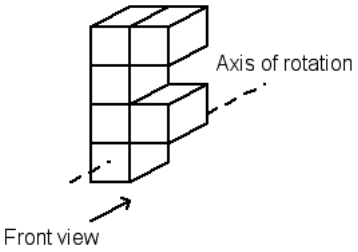
16. This object is built using 5 linking cubes.
The object is rotated vertically 90° clockwise about the horizontal axis shown.
Draw the top, left side, and front views of the rotated object.



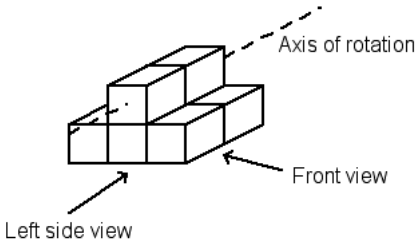
17. This object is built using 5 linking cubes.
The object is rotated vertically 180° about the horizontal axis shown.
Draw the top, left side, and front views of the rotated object.



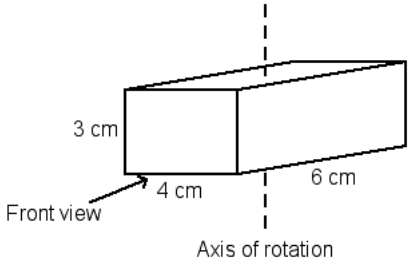
18. This object is built using 6 linking cubes.
The object is given a vertical rotation of 90° clockwise about the horizontal axis shown.
Draw the top, left side, and front views of the rotated object.



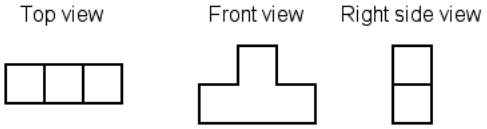
19. This object is built using 8 linking cubes.
The object is rotated vertically 90° away from you about the horizontal axis shown.
Draw the top, front, and side views of the rotated object.



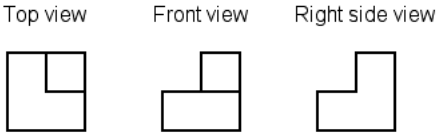
20. This rectangular prism is given a horizontal rotation of 90° clockwise about the vertical axis shown.
Draw the top, left side, front, and right side views of the rotated prism. Label the dimensions.



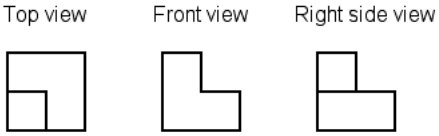
8.3 21. These are the top, front, and right side views of an object built using linking cubes.
Sketch a 3-D picture of the object.



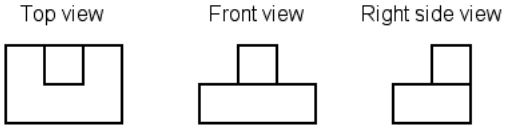
22. These are the top, front, and right side views of an object built using linking cubes.
Sketch a 3-D picture of the object.



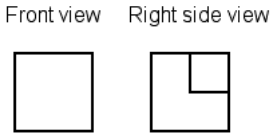
23. These are the top, front, and right side views of an object built using linking cubes.
Sketch a 3-D picture of the object.



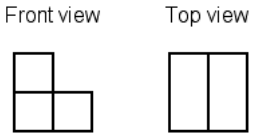
24. These are the top, front, and right side views of an object built using linking cubes.
Sketch a 3-D picture of the object.



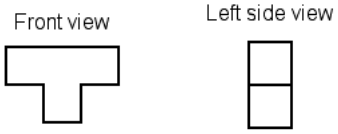
25. An object is built using linking cubes.
The diagram shows the front and right side views of the object.
Sketch a 3-D picture of the object.



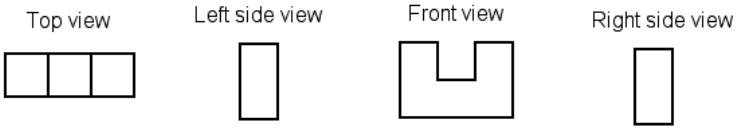
26. These are the front and top views of an object built using linking cubes.
Sketch a 3-D picture of the object.



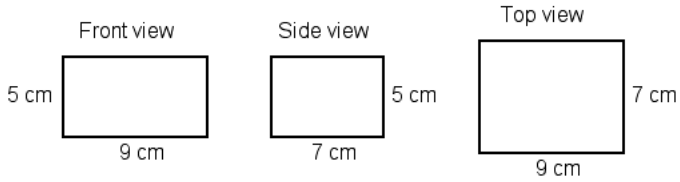
27. An object is built using 4 linking cubes. The diagram shows 2 views of the object.
    a) Sketch a 3-D picture of the object.
    b) Draw the other views of the object.



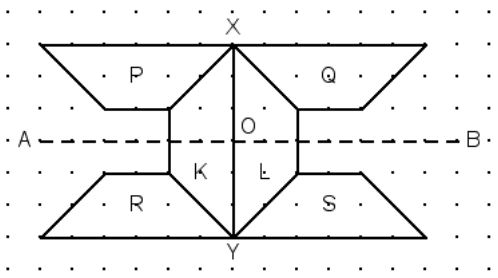
28. These are the views of an object built using linking cubes.
Use these views to build the object.



29. An object has the same top, front, and side views. Describe a possible object.
30. These are the front, side, and top views of an object.
Sketch a 3-D picture of the object. Label the dimensions.

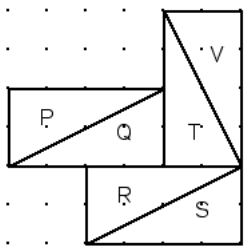


8.4 31. Use this diagram to identify each transformation.



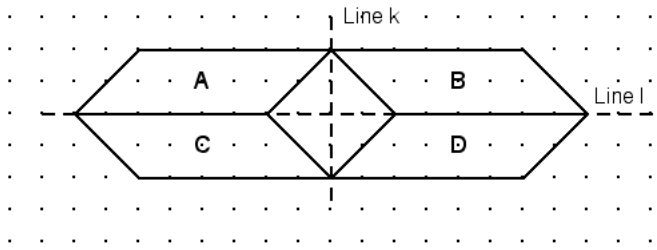
a) Shape Q is the image of Shape P.
b) Shape L is the image of Shape P.
c) Shape R is the image of Shape P.

32. Use this diagram to identify each transformation.



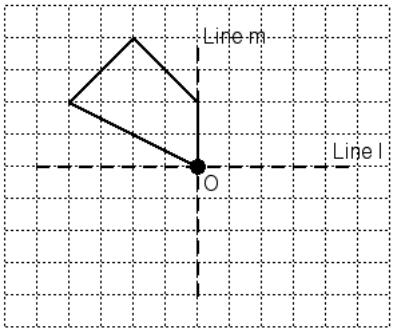
a) Triangle R is the image of Triangle V.
b) Triangle R is the image of Triangle P.

33. Use this diagram to identify each transformation.



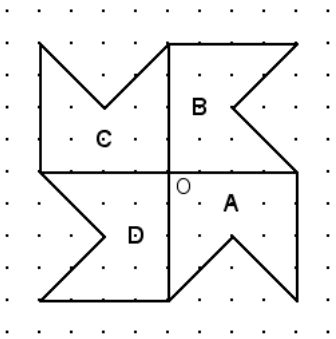
a) Shape D is the image of Shape B.
b) Shape D is the image of Shape A.
c) Shape D is the image of Shape C.

34. Create a design by applying each transformation to the original shape.



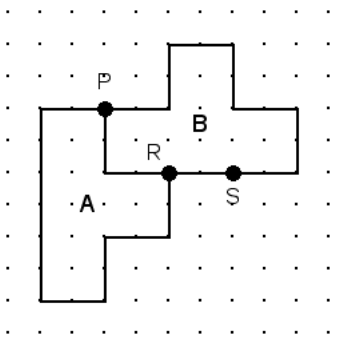
a) Reflection in Line m
b) 180° rotation about point O
c) Reflection in Line l

35. Use this diagram to identify each transformation.

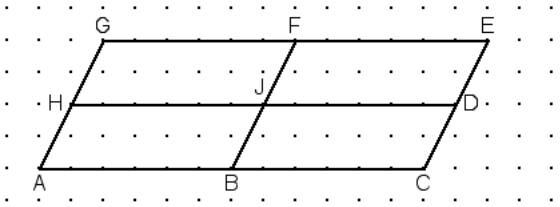


a) Shape B is the image of Shape A.
b) Shape C is the image of Shape A.
c) Shape D is the image of Shape A.

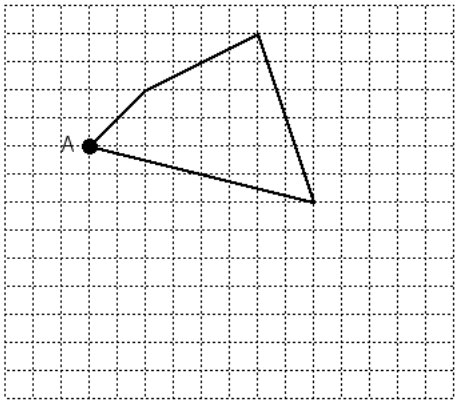
36. Shape B is the image of Shape A. Describe the transformation.



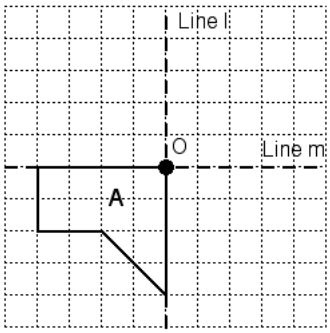
37. Describe Parallelogram JDEF as a transformation image of Parallelogram ABJH in 2 ways.



38. Draw the image of this shape after each transformation.
    a) Translation 4 units right and 6 units down
    b) 90° clockwise rotation about point A

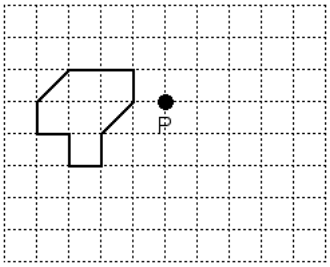


39. a) Draw the image of Shape A after each transformation.
        i) Shape B is the image after a reflection in Line l.
        ii) Shape C is the image after a rotation of 90° clockwise about point O.
        iii) Shape D is the image after a rotation of 180° about point O.

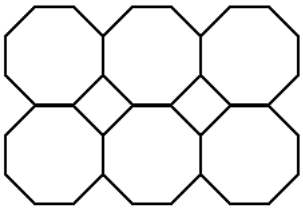


b) Describe a single transformation that will transform Shape D to Shape C.

40. Draw the image of this shape after each transformation.
    a) Translation 4 units right and 2 units down
    b) Rotation of 180° about point P.

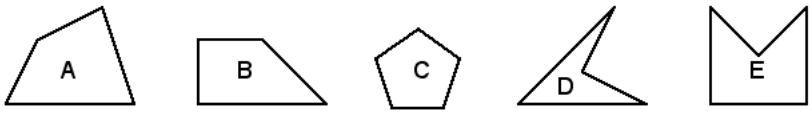


8.5 41. Jodi wants to tile her bedroom floor with octagons. This pattern shows part of the floor.



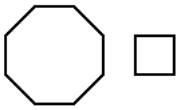
Does Jodi need another shape to cover the floor with no gaps? If so, what is it?

42. Which of these polygons tessellate?



43. Draw the 4th tile in this tessellation.

44. Show how this regular octagon and this square combine to form a shape that tessellates. Explain why the composite shape tessellates.

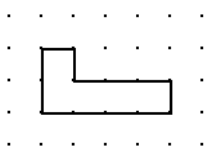


45. Use this shape to tessellate 2 different ways.

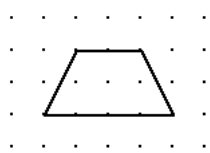
46. a) Name the polygons that tessellate.
    - Equilateral triangle
    - Square
    - Rectangle
    - Rhombus
    - Regular pentagon
    - Regular hexagon
    - Regular octagon

    b) For the polygons that cannot cover a plane with no gaps, name a shape that would help to fill the gaps.

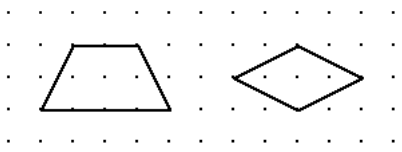
47. Show how this polygon tessellates 2 different ways.



48. This is one of the pattern blocks, the trapezoid. Show how this shape tessellates 2 different ways.

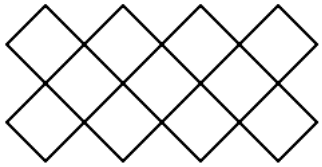


49. These are 2 pattern blocks, the trapezoid and the rhombus.
    Show how they combine to form a shape that tessellates 2 different ways.

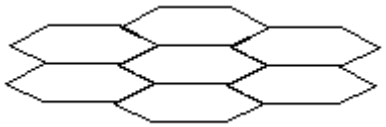


50. A regular pentagon does not tessellate. Draw 2 pentagons that tessellate.

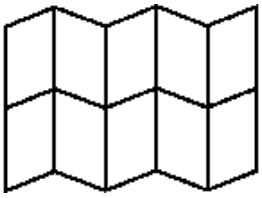
8.6 51. Sketch a polygon that can be used with transformations to create this design.



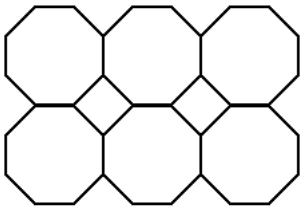
52. Sketch a polygon that can be used with transformations to create this design.



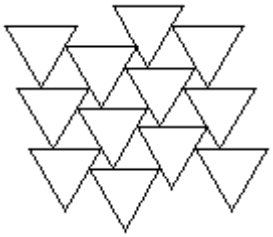
53. Sketch a polygon that can be used with transformations to create this design.



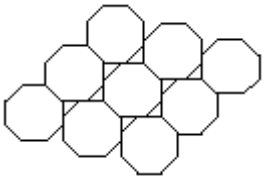
54. a) What are the polygons used to create this tessellation?
    b) What transformations are used?



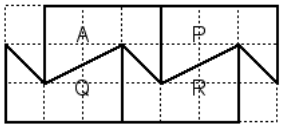
55. a) What are the polygons used to construct this tessellation?
    b) What transformations are used?



56. a) What are the polygons used to construct this tessellation?
    b) What transformations are used?

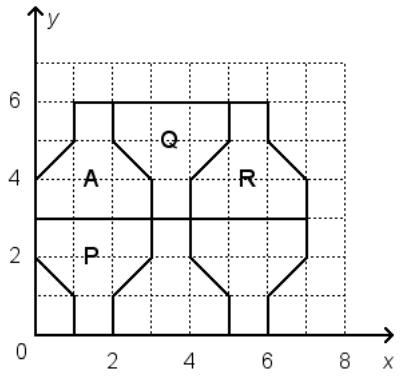


57. In this tessellation, Shape A is the original shape.



Describe possible transformations of Shape A that will produce:
a) Shape P
b) Shape Q
c) Shape R

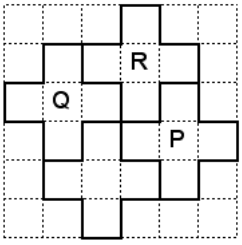
58. In this tessellation, Shape A is the original shape.



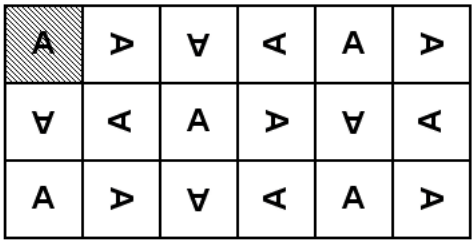
Describe possible transformations of Shape A that will produce:

a) Shape P
b) Shape Q
c) Shape R

59. In this tessellation, Shape P is the original shape.
Describe Shape Q as the transformation image of Shape P 2 different ways.

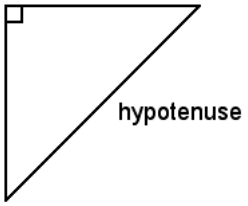


60. This design is a tessellation constructed using the shaded square A.
Identify 2 transformations necessary to create this design.



Answers

Chapter 1

1. 36
2. 64 and 81
3. 121 and 144
4. 12 cm
5. 9 square units
6. 196 square units
7. 20 units
8. 81, 100, 121
9. 16, 25
10. 256
11. 64
12. 30
13. 8
14. 1, 2, 5, 7, 10, 14, 35, 70
15. $81 + 25 = 106$
16. 4^2, $\sqrt{289}$, 19, 5^2
17. 40
18. 49, 64, 81
19. A factor is a number that divides exactly into another number.
20. $A = 63$ m^2
21. $s = \sqrt{65}$ cm
22. $A = 18$ square units
    $s = \sqrt{18}$ units
23. $A = 41$ square units
    $s = \sqrt{41}$ units
24. Square B
25. $A = 289$ square units
    $s = 17$ units
26. Line A
27. $A = 19$ cm^2
28. $s = \sqrt{149}$
29. 7
30. $A = 45$ square units
    $s = \sqrt{45}$ units
31. 3 and 4
32. 11.83 m
33. $\sqrt{31}$
    5.6
34. $\sqrt{221}$
35. 5 is less than $\sqrt{32}$
36. 9
37. 15.56 cm
38. 14 m
39. 4 cm
40. 18 m by 18 m
41. 

42. $5^2 + 8^2$
43. 4 m, 8 m
44. 15 units
45. $\sqrt{120}$ cm
46. 17 units
47. 6.7 units
48. Rectangle: 15.62 units
    Square: 15.56 units
    The rectangle has the longer diagonal.
49. Side length: 13 cm
    Diagonal length: 18.4 cm
50. Square A: 5 square units
    Square B: 20 square units
    Square C: 25 square units
51. 17
52. No, because $2^2 + 21^2 \neq 29^2$.
53. 7, 24, 25
54. $\sqrt{5}, \sqrt{12}, \sqrt{17}$
    $\sqrt{7}, \sqrt{5}, \sqrt{12}$
55. a) Right triangle
    b) Right triangle
    c) Not a right triangle
    d) Right triangle
56. a) Right triangle
    b) Not a right triangle
    c) Right triangle
    d) Right triangle
57. No.
    $24^2 + 43^2 \neq 64^2$
58. $3^2 + 5^2 = 34$
    9 units^2 + 25 units^2 = 34 units^2

This triangle is a right triangle.

59. $24^2 + 10^2 = 26^2$
The garden is a rectangle because all angles are right angles.

60. $24^2 + 32^2 = 40^2$
Quadrilateral ABCD is a rectangle.
Bennie is correct.

61. Lengths of legs: 6, 8
Length of hypotenuse: 10

62. L.S. $= 2.1^2 + 2.8^2 = 12.25$
R.S. $= 3.5^2 = 12.25$
Since 12.25 = 12.25, the triangle is a right triangle.

63. 24 units

65. If the third side is the hypotenuse, the hypotenuse is 6.3 cm.
If the third side is a leg, the leg is 2.8 cm.

66. 132 km

67. 7.8 m

68. 32.7 cm

69. 9.5 km

70. 125 m

71. PQ = 12.8 units

72. A, D, G, E, F

73. 13.1 cm

Chapter 2

1. $(-14) \times (+5) = -70$
2. $(-3) \times (-20) = 60$
3. The products in a), c), and d) are negative.
4. −80
5. One integer is positive and the other is negative.
6. −28 cm
7. −3
8. −6
9. +250
10. +52
11. $(+5)(-13) = -65$
12. $(+37) + (+4)(-5) = (+37) + (-20) = +17$
13. $(+42) - (+4)(-9) = (+42) - (-36) = (+42) + 36 = +78$
14. $(-4) \times (+12) = -48$
15. $(-7) \times (-5) = +35$
16. $(+4)(-4)(+6) = -96$
17. The products of i), iii), and iv) are the same. They all equal −72.
18. The next 2 terms are: +162, –486
Start at +2. Multiply by –3 each time.
19. The next 3 terms are: –243, +729
Start at –3. Multiply by −3 each time.
20. $(+29) + (+8)(-4) = (+29) + (-32) = -3$
The temperature after 8 h was –3°C.
21. −15
22. +11
23. $(+12) \div (+4)$
$(-10) \div (-2)$
24. $(+35) \div (-4)$
$(+35) \div (-5)$
$(+35) \div (-7)$
$(-24) \div (+6)$
25. $(-8) \times (+2) = -16$
26. $(-9) \times (-7) = +63$
27. $(-18) \div (+6) = -3$
$(-18) \div (-3) = +6$
28. $(+21) \div (-3) = -7$
$(+21) \div (-7) = -3$
29. −10°C
30. 6 h
31. negative
32. $(+180) \div (-5) \times (+6) = -216$
$(+180) \times (-5) \div (+6) = -150$
$(+180) \div (-5) \times (+6) < (+180) \times (-5) \div (+6)$
33. $(-85) \div (+17) = -5$
$(-85) \div (-5) = +17$
34. $(+132) \div (-11) = -12$
$(+132) \div (-12) = -11$
35. $(+24) \div (-8) = -3$
36. $(-24) \div (-12) = +2$
37. −1, –5, −11, −55
38. −1, –2, –4, –7, −14, –28
39. $5
40. The next 3 terms are: –64, +16, –4
Start at +4096. Divide by −4 each time.
41. a) Multiply: 5×4
b) Divide: $15 \div 5$
42. $(5^2) - (5)^2 = 25 - 25$
$= 0$
43. $6(12 - 6) - 20 = 6(6) - 20$
$= 36 - 20$
$= 16$

44. $11-(7\times 9)-7 = 11-63-7$
$= -59$

45. $10\div 6\times 15 = \frac{10}{6}\times 15$
$= \frac{10\times 15}{6}$
$= \frac{150}{6}$
$= 25$

46. $\frac{(7)(9)-(-1)}{8} = \frac{63-(-1)}{8}$
$= \frac{64}{8}$
$= 8$

47. $\frac{-28}{(-5)(-6)-2} = \frac{-28}{30-2}$
$= \frac{-28}{28}$
$= -1$

48. $\frac{9(-8)\div 2(-3)}{2(-3)} = \frac{(-72)\div(-6)}{-6}$
$= \frac{12}{-6}$
$= -2$

49. 16

50.
$[5-2(-9)]\times[(-2)(-9)-23] = (5+18)\times(18-23)$
$= 23\times(-5)$
$= -115$

Chapter 3

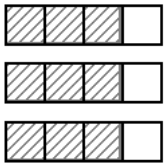
1. $\frac{12}{5}$

2. $4\times\frac{3}{5} = \frac{12}{5}$

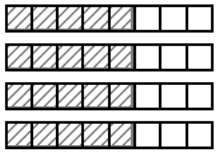
3. Pictures may vary. Sample:

a) $2\times\frac{3}{5} = \frac{6}{5}$

b) $3\times\frac{3}{4} = \frac{9}{4}$



c) $4\times\frac{5}{8} = \frac{20}{8}$



4. Pictures may vary. Sample:
Draw 5 rows of strips, each with $\frac{3}{10}$ shaded. The shaded part represents $\frac{15}{10}$.

5. $\frac{15}{4}$

6. $\frac{25}{3}$

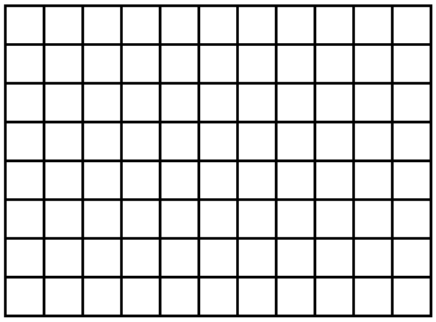
7. $1\frac{3}{5}$ cups

8. $5\times\frac{1}{4}$ h $= 1\frac{1}{4}$ h

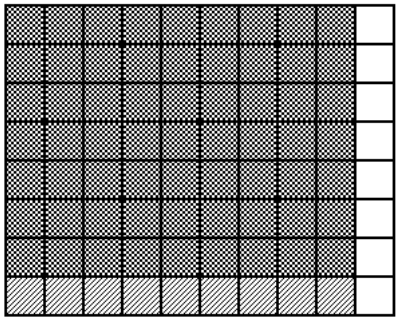
9. $3\times\frac{1}{8} = \frac{3}{8}$

10. $\frac{3}{4}\times 17 = \frac{51}{4}$, or $12\frac{3}{4}$
It will take $12\frac{3}{4}$ h to make 17 widgets.

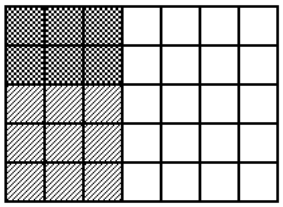
11. Answers may vary. Sample:
A 11 by 8 rectangle



12. $\frac{7}{8} \times \frac{9}{10} = \frac{63}{80}$

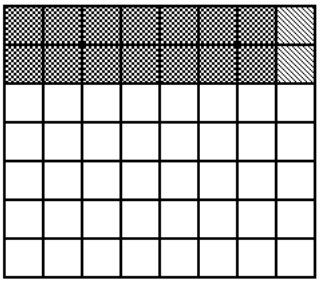


13. $\frac{3}{4} \times \frac{1}{5} = \frac{3}{20}$
14. $\frac{1}{8} \times \frac{2}{5} = \frac{1}{20}$
15.



$\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$

16.



$\frac{7}{8} \times \frac{2}{7} = \frac{1}{4}$

17. $\frac{8}{21}$
18. $\frac{1}{8}$
19. $\frac{1}{4}$
20. One-eighth
21. 3, 9
22. $\frac{15}{13}$
23. $\frac{5}{14}$
24. $\frac{2}{3}$
25. 1
26. $\frac{7}{12}$
27. 3
28. 2
29. $\frac{5}{6}$
30. 10 students
31. $2\frac{2}{3},\ \frac{8}{3}$
32. $2\frac{7}{8},\ \frac{23}{8}$
33. $\frac{3}{5}$
34. 9
35. $\frac{77}{6},\ 12\frac{5}{6}$
36. a) iii
    b) v
    c) i
    d) ii
37. a) About $3 \times 5 = 15$
    b) About $3 \times 6 = 18$
    c) About $4 \times 5 = 20$
    d) About $4 \times 6 = 24$
38. $3 \times 7\frac{3}{4} = 3 \times \frac{31}{4} = 23\frac{1}{4}$

    The total bill was $23\frac{1}{4}$ dollars.
39. $2\frac{1}{2} \times 7\frac{1}{2}$ h $= \frac{5}{2} \times \frac{15}{2}$ h $= \frac{75}{4}$ h $= 18\frac{3}{4}$ h
40. $2\frac{1}{2} \times 6\frac{1}{4}$ h $= \frac{5}{2} \times \frac{25}{4}$ h $= \frac{125}{8}$ h $= 15\frac{5}{8}$ h
41. 20
42. $\frac{4}{21}$
43. $\frac{1}{9}$
44. 45
45. 24 boxes

46. 20 bottles
47. 80 pieces
48. $3 \div \frac{1}{4} = 12$
49. $3 \div \frac{5}{9},\ 3 \div \frac{9}{5},\ 5 \div \frac{3}{9},\ 5 \div \frac{9}{3},\ 9 \div \frac{3}{5},\ 9 \div \frac{5}{3}$
50. a) $2 \div \frac{10}{12},\ 2 \div \frac{12}{10},\ 10 \div \frac{2}{12},\ 10 \div \frac{12}{2},$
$12 \div \frac{2}{10},\ 12 \div \frac{10}{2}$

b) $2 \div \frac{10}{12} = \frac{12}{5}$

$12 \div \frac{10}{2} = \frac{12}{5}$

$2 \div \frac{12}{10} = \frac{5}{3}$

$10 \div \frac{12}{2} = \frac{5}{3}$

$10 \div \frac{2}{12} = 60$

$12 \div \frac{2}{10} = 60$

51. $\frac{4}{11}$
52. $\frac{5}{3}$
53. $\frac{9}{7} = 1\frac{2}{7}$
54. $\frac{12}{13} \div \frac{13}{12} = \frac{144}{169}$
55. $1\frac{3}{10}$
56. $\frac{5}{7} \div \frac{3}{5} = \frac{5}{7} \times \frac{5}{3} = \frac{25}{21}$, or $1\frac{4}{21}$
57. $\frac{7}{12} \div \frac{2}{3} = \frac{7}{12} \div \frac{8}{12} = \frac{7}{8}$
58. $4\frac{3}{4}$ pieces
59. 5 cakes
60. $\frac{49}{51} \times \frac{17}{14} = \frac{7}{6}$, or $1\frac{1}{6}$
61. $\frac{25}{7}$
62. $10\frac{1}{4}$
63.
a) iii)
b) i)
c) ii)
d) iv)

64. $3\frac{3}{5} \div 2\frac{1}{10} = \frac{18}{5} \div \frac{21}{10} = \frac{36}{10} \div \frac{21}{10} = \frac{36}{21} = \frac{12}{7}$,
or $1\frac{5}{7}$
65. $2\frac{2}{5} \div 3\frac{3}{4} = \frac{12}{5} \div \frac{15}{4} = \frac{12}{5} \times \frac{4}{15} = \frac{16}{25}$
66. $\frac{8}{3}$, or $2\frac{2}{3}$
67. 6 evenings
68. $4\frac{1}{2}$ batches
69. 14
70. 1
71. $\frac{19}{30}$ of the box
72. $4\frac{1}{8}$ cups
73. $\frac{5}{8}$ of the exam papers
74. $1\frac{7}{12}$ kg
75. 12 pieces
76. 12 m^2
77. $6\frac{1}{4}$ h
78. 9 min
79. 5 pieces
80. $31\frac{1}{2}$ dozen
81. $\frac{3}{4}$
82. $1\frac{1}{12}$
83. $1\frac{3}{8}$
84. $\frac{4}{5}$
85. $\frac{7}{12}$
86. $1\frac{3}{4}$

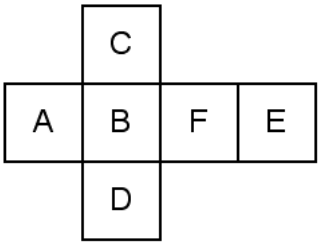
87. $6\frac{5}{8}$

88. $\frac{4}{5}$

89. $2\frac{17}{32}$

Chapter 4

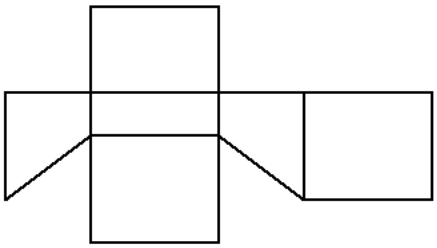
1. Yes; Faces K and M, L and O, and N and P will be opposite faces.
2. Diagrams may vary. Sample:



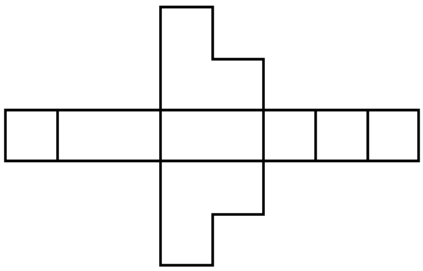
3. Diagrams may vary. Sample:

$3\frac{1}{2}$

4. Diagrams may vary. Sample:

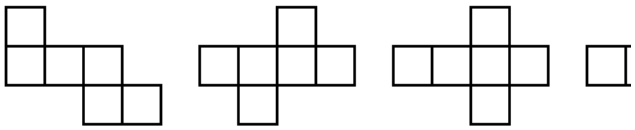


5. Diagrams may vary. Sample:



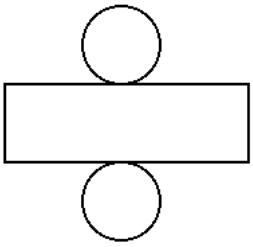
6. Two hexagons and 6 rectangles

7. One octagon and 8 triangles
8. Answers will vary. Sample:

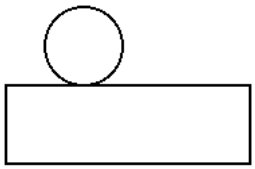


9. a) Two octagons and 8 rectangles
   b) One octagon and 8 triangles

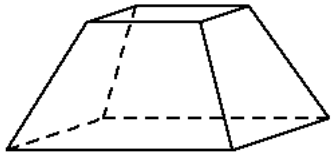
10.
   a) Diagrams may vary. Sample:



   b) Diagrams may vary. Sample:



11. Triangular pyramid, or tetrahedron
12. The object is a cylinder and it is not a polyhedron.
    A polyhedron has faces that are polygons. A circle is not a polygon.
13. The cereal box is in the shape of a rectangular prism.
    The box measures 7 cm by 12 cm by 28 cm.
14. The juice container is in the shape of a square pyramid.
    The square base has side length 12 cm and the height is 9 cm.
15. Diagrams B, C, and D
16. Diagram A is not a net.
    Diagram B is a net of a rectangular pyramid.
    Diagram C is a net of a hexagonal prism.
17. Object A is a triangular prism.
    Object B is a triangular pyramid, or tetrahedron.
    Object C is a cylinder.
18. Face A will be opposite face D.
    Face B will be opposite face E.
    Face C will be opposite face F.
19. A hexagonal prism
20. Diagrams may vary. Sample:

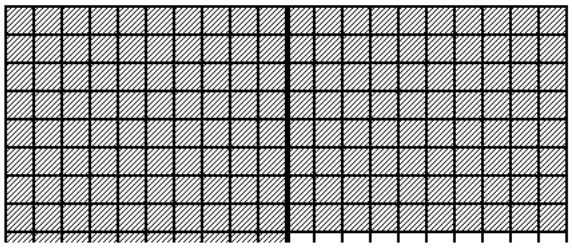


21. 264 cm^2
22. 66 cm^2
23. 242 m^2
24. The area of the material required is 332 cm^2.
25. 344 cm^2

26. a) Pizza box: 3456 cm^2
    Cereal box: 1226 cm^2
    Box of tea bags: 1600 cm^2
    b) The cereal box has the least surface area.
27. a) 36 cm^2
    b) 6 cm
28. The new surface area equals the original surface area multiplied by 4.
29. a) The surface area of the cube is 96 cm^2.
    b) The new surface area is 864 cm^2.
    c) The ratio is 864:96, or 9:1.
30. a) The possible dimensions are: 1 cm by 1 cm by 10 cm and 1 cm by 2 cm by 5 cm
    b) The corresponding surface areas are: 42 cm^2 and 34 cm^2
31. The sum of the areas of the 3 rectangular faces is 288 m^2.
32. The surface area of the prism is 173.1 cm^2.
33. The surface area of the prism is 688 cm^2.
34. The edge could be 7 cm or 3 cm.
35. The surface area of the prism is 169 cm^2.
36. The surface area of the prism is 246.4 cm^2.
37. The surface area of the net is 162 cm^2.
38. The surface area of the prism is 51.5 cm^2.
39. The area of each rectangular face is 112 cm^2.
40. a) The surface area of the prism is 174 m^2.
    b) If all dimensions are doubled, the new surface area will be 696 m^2.
    c) The new surface area is 4 times the original surface area.
41. The volume is 171 cm^3.
42. The volume is 1078 m^3.
43. The volume is 90 cm^3.
    The surface area is 129 cm^2.
44. a) The volume is 6912 cm^3.
    b) Each student gets 192 cm^3 of chocolate.
45. The volume of prism A is 495 cm^3.
    The volume of prism B is 480 cm^3.
    Prism A has the greater volume.
46. The water is 12 cm deep.
47. a) The height is 3 cm.
    b) The surface area of the smallest face is 12 cm^2.
48. a) The volume of the cube is 125 cm^3.
    b) The new volume is 1000 cm^3.
    c) The ratio is 1000:125, or 8:1.
49. The new volume equals the original volume multiplied by 8.
50. The volume of the box will be 384 cm^3.
51. The volume of the prism is 220 cm^3.
52. The volume of the prism is 216 cm^3.
53. The base area of the prism is 7 cm^2.
54. The volume of each prism is 120 cm^3.
55. The volume of the prism is 80.73 cm^3.
56. The length of the prism is 18 cm.
57. The volume of each prism is 441 cm^3.
58. The depth of the water is 1.6 m.
59. a) The volume of Prism A is 80 cm^3.
    The volume of Prism B is 81 cm^3.
    b) Prism B has the greater volume.
60. A = 1 cm^2, l = 8 cm
    A = 8 cm^2, l = 1 cm
    A = 2 cm^2, l = 4 cm
    A = 4 cm^2, l = 2 cm
61. The circumference of the circle is about 113 cm.
62. The circumference of the circle is about 53 cm.
63. The area of the net is about 50 cm^2.
64. The area of the net is about 188 cm^2.
65. Cylinder C has the greatest surface area.
66. The surface area of the tank is about 143.8 m^2.
67. The curved surface area of the tube is about 829 cm^2.
68. The area to be painted is about 4311 cm^2.
69. The total area to be painted is about 2695 m^2.
70. The circumference of the circular base is 24 cm.
71. The volume of the cylinder is 2562 cm^3.
72. The volume of the cylinder is about 6104.2 cm^3.
73. The volume of the cylinder is about 883.1 cm^3.
74. The volume of the cylinder is about 703 cm^3.
75. The volume of concrete in the pillars is about 2831 m^3.
76. The volume of soil is about 10 174 cm^3.
77. The volume of dirt removed was about 7.5 m^3.

78. The volume of concentrate in each can is about 285 mL.
79. The new volume is 50 cm^3.
80. Cylinder B has the greater volume since the increase in radius is squared.

Chapter 5

1. $\frac{31}{200}$; 0.155
2. $\frac{27}{400}$; 0.0675
3. $\frac{27}{5000}$; 0.0054
4. 0.075; 7.5%
5. Rocky has read 50% of the books on the list.
6. Sugar is 25% by mass of the candy bar.
7. $\frac{73}{200}$; 36.5%
8. 0.608, 0.639, 0.783, 0.853, and 0.915
9. No, Abel cannot colour more than 100% of a hundred chart.
   $25\% + 36\% + 13\% + 31\% = 105\%$
10. 0.4%; $\frac{1}{250}$; 0.004
11. 
12. 210%
13. The larger shape represents 250%.
14. $2\frac{19}{25}$; 276%
15. $\frac{3}{1000}$; 0.3%
16. The selling price of the boots is $184.
17. For the charity run, 13 people completed under 45 min.
18. The town's population at the end of the first year was 4560.
    The town's population at the end of the second year was 3876.
19.

Percent	Value
2000% of 320	6400
200% of 320	640
20% of 320	64
2% of 320	6.4
0.2% of 320	0.64

20. 69 is 34.5% of 200.
21. 20%
22. The number is 60.
23. The factory will lay off 4140 workers.
24. About 186 people will be employed after the expansion.
25. The percent increase in population was 8%.
26. The regular price of the bike is $760.
27. The selling price of the jacket was $98.82 after two weeks.
28. The increase in attendance was 12%.
29. The increase in perimeter is 10%.
    The increase in area is 21%.
30. The total sales tax on the book is $6.12.
31. The GST on the running shoes is $3.57.
32. The percent decrease in price is 25%.
33. The percent increase in price is 42%.
34. The selling price before taxes is $315.
35. The regular price of the camera, including taxes, is $147.00.
36. $356 400
37. The amount of tax paid would be $40.95.
38. A is the better deal.
    Two DVDs at 20% off cost $64, which is less than $74.
39. The selling price of the sweater, including taxes, would be $128.52.
40. Answers may vary. Sample:
    The ratio of shaded triangles to total number of triangles is 3:8.
    The ratio of shaded triangles to blank triangles is 3:5.
    The ratio of total number of triangles to blank triangles is 8:5.
41. Answers may vary. Sample:
    The ratio of shaded area to area of circle is 7:12.
    The ratio of unshaded area to area of circle is 5:12.

The ratio of shaded area to unshaded area is 7:5.

42. Shade any 5 triangles.
43. The ratio of T-shirts to sweaters is 5:4.
44. The ratio of boys to girls is 11:13.
    The ratio of students to adults is 24:5.
45. The ratio of dogs to total number of dogs and cats is 9:23.
46. a) The ratio of red balls to yellow balls is 8:11.
    b) The ratio of green balls to total number of balls is 15:34.
    c) The ratio of yellow balls to non-yellow balls is 11:23.
47. Green to red and blue
48. Remove 4 triangles.
49. a) 4:25
    b) 5:24
50. a) The ratio of comic books to novels is 15:17.
    b) The ratio of novels to books on the shelf is 17:32.
    c) The new ratio of comic books to books on the shelf is 12:29.
51. The new ratio of girls to boys is 10:13.
    The new ratio of boys to students in the class is 13:23.
52. Answers may vary. Sample:
    The equivalent ratios are 10:4 and 15:6.
53. Answers may vary. Sample:
    The equivalent ratios are 4:5 and 40:50.
54. The ratios 16:18, 56:63, and 40:45 are equivalent.
55. Shade any 10 squares. The ratio of shaded squares to unshaded squares is 5:7.
56. Shade any 10 squares. The ratio of shaded squares to total number of squares is 5:12.
57. The ratio of letters to numbers is 1:2.
58. Answers may vary. Sample:
    Two equivalent ratios are 25:100 and 1:4.
59. The ratio of Canadian stamps to United Kingdom stamps to Asian stamps is 8:5:3.
60. There are 70 hockey cards.
61. There are 18 fiction books.
62. The ratio of adults to students is 5:7.
63. a) There are 28 girls.
    b) The new ratio of boys to girls is 1:2.
64. The ratio 2:3 is greater.
65. The locker with 7 out of 8 mitts that are baseball mitts has more baseball mitts.
66. The apple drink with a juice to water ratio of 5:3 has higher apple juice content.
67. The missing number can be any number greater than or equal to 4.
68. The punch is stronger. More concentrate is used with the same amount of water.
69. Jake's punch is stronger.
    4:5 = 28:35
    5:7 = 25:35
    The ratio 4:5 is greater than the ratio 5:7.
70. Recipe A gives a stronger chicken broth.
71. Class A has more fiction books.
72. Mr. Bell's class has more fiction books.
73. Ahmed has the better score.
    17 of 20 is equivalent to 51 of 60.
    13 of 15 is equivalent to 52 of 60.
74. For the same number of boys and girls in the library, more boys want to surf the net.
    Boys: 3:5 = 6:10
    Girls: 4:10 = 4:10
75. The Northern Lights has a better record.
    The Prairie Pirates: 9:8 = 63:56
    The Northern Lights: 10:7 = 80:56
    The ratio 9:8 is less than 10:7.
76. Andrew has more hockey cards.
    Todd: 5:4 = 25:20
    Andrew: 7:5 = 28:20
    The ratio 5:4 is less than the ratio 7:5.
77. Box B contains more red cubes.
    Box A: 5:11 = 50:110
    Box B: 9:10 = 99:110
    The ratio 5:11 is less than the ratio 9:10.
78. Nadia played better.
    Miguel: 5:12 = 55:132
    Nadia: 8:11 = 96:132
    The ratio 5:12 is less than the ratio 8:11.
79. Shade 1 has a darker shade of yellow.
    Shade 1: 3:2 = 9:6
    Shade 2: 5:3 = 10:6
    The ratio 3:2 is less than the ratio 5:3.
80. $x = 11\frac{1}{3}$
81. The team won 50 games.
82. a) There are 30 girls.
    b) The ratio of adults to boys is 4:9.
83. 250 nutritionists recommended hot oatmeal.
84. The length of the rectangle is 119 cm.
85. a) The width of the model car is 10.5 cm.
    b) The height of the actual car is 2.2 m.

86. a) The ratio of water to colour concentrate is 9:2.
    b) The volume of water needed is 45 mL.
    c) The volume of colour concentrate needed is 20 mL.
87. a) The actual length of the ship is 126 m.
    b) The model ship is 60 cm long.
88. a) The ratio of flour to fruit is 7:12.
    b) The ratio of sultanas and raisins to cherries is 3:1.
    c) About 5.1 kg of fruit is required.
89. a) 16 L of green paint is required.
    b) 21 L of white paint is required.
    c) 12 L of green paint and 18 L of white paint are required.
90. Bev should pack 84 boxes and Liz should pack 48 boxes.
91.

	Number of Heartbeats	Time (min)	Heart Rate (beats/min)
Chicken	600	2	300
Elephant	120	4	30
Human Adult	1440	20	72
Cat	600	5	120
Whale	1680	240	7
Dog	270	3	90

92. Sadiq's unit rate of typing is 55 wpm.
93. Amina's unit rate of sticking stamps is 30 stamps/min.
94. The plane travelled 300 km in 1 h.
95. Elisa was paid \$6.50/h.
96. It costs \$627.00.
97. Corrie drove faster.
    Corrie drove at 44 km/h while Geri drove at 43 km/h.
98. The player's scoring rate is 0.3 goals per game.
99. Terry Fox ran about 38 km each day.
100. The average distance covered each day was about 12.5 km.
101. It will take Trenton 7 min to type the essay.
102. a) Kim earns \$8 for 1 h of work.
     b) Kim's hourly rate of pay is \$8/h.
     c) Kim earns \$240 for working 30 h.
103. a) The cost of ribbon is \$3.5 per metre.
     b) The cost of 11 m of ribbon is \$38.5.
     c) I can buy 8 m of ribbon for \$28.
104. a) They would get £75.
     b) The value of the gift is \$65.80 Can.
105. a) Enid's average speed was 12 km/h.
     b) It took Alicia 4.2 h to complete the race.
106. Tanya's average score was 2.4 points per game.
107. a) In 1 h, 2.6 cm of snow fell.
     b) Between 8 p.m. and 7 a.m., 28.6 cm of snow fell.
108. Car A: 62 km/h
     Car B: 63 km/h
     So, Car B has the greater average speed.
109. Bailey: each lap in 3.4 min
     Aileen: each lap in 3.5 min
     So, Bailey ran faster.
110. Shazia: \$8.30/h
     Michelle: \$8.60/h
     So, Michelle's job pays more.
111. The population density is 118 people/km^2.
112. The best buy is 15 packs for \$4.00.
113. The best buy is 36 pens at 14¢ each.
114. a) The area covered by 1 kg of grass seed is 500 m^2.
     b) 1.6 kg of grass seed is needed.
115. The 36-box package is the better buy because its cost per box is less.
     For the 18-box package, the unit cost is \$0.43.
     For the 36-box package, the unit cost is \$0.31.

Chapter 6

1. $x = 6$
2. The unknown mass is 17 g.
3. A mass of 11 g is needed for the left pan.
4. $x = -2$
5. Each unknown mass is 5 g.
6. $x = -6$
7. $x = -5$
8. a) iii
   b) i
   c) iv
   d) ii
9. $x = 3$
10. a) Any equation that contains only positive integers and has an integer solution.

For example, $2a + 3 = 11$, $a = 4$

b) Any equation that contains at least one negative integer and has an integer solution.
For example, $2b - 3 = -11$, $b = -4$

11. $x = 3$
12. $t = -5$
13. $p = 7$
14. $w = 2$
15. Substitute $y = 5$ into the equation $6y - 7 = 23$.
Left side = $6(5) - 7 = 30 - 7 = 23$
Right side = 23
16. Let x be the number of hours.
$25 + 8x = 81$
$x = 7$
Sean rented the boat for 7 h.
17. Let x be the number of weeks.
$56 + 25x = 406$
$x = 14$
It will take Jacqui 14 weeks.
18. a) Let w represent the number of weeks it will take Ivan to save $45.
$3w = 45$
b) $w = 15$
It will take Ivan 15 weeks.
19. a) Let w represent the number of weeks it will take Brandon to save enough money for the stereo. $90 + 10w = 200$
b) $w = 11$
It will take Brandon 11 weeks.
20. a) Let m represent the amount of money Miranda withdrew each week.
$560 - 13m = 365$
b) $m = 15$
Miranda withdrew $15 each week.
21. $w = 28$
22. $t = -104$
23. $y = 85$
24. $x = 35$
25. $x = 18$
26. $x = 4$

Substitute $x = 4$ into the equation $\frac{x}{2} - 7 = -5$.

Left side = $\frac{x}{2} - 7 = \frac{4}{2} - 7 = -5$

Right side = –5

Since left side equals the right side, $x = 4$ is the solution.

27. Let p represent the number.
$\frac{p}{-7} = -8$
$p = 56$
28. Let y represent the number.
$\frac{y}{3} - 7 = 14$
$y = 63$
29. Let x represent the number.
$13 - \frac{x}{5} = 8$
$x = 25$
30. Let z represent the number.
$2 - \frac{z}{7} = 0$
$z = 14$
31. $-66 - 11z$
32. $5x + 45$
33. Each pair of expressions in part b) and d) are equivalent.
34. a) iv
b) i
c) iii
d) ii
35. a) $14(\$32 + \$17)$
$14(\$32) + 14(\$17)$
b) The total cost for the team is $686.
36. a) $4(\$11 + \$9)$
$4(\$11) + 4(\$9)$
b) Ms. Jones has to pay $80.
37. $P = 2a + 2b$
$P = 2(a + b)$
38. $P = 2d + 2e + 2f$
$P = 2(d + e + f)$
39. $35 + 5x$
40. $6s - 54 + 6t$
41. $y = 8$
42. $p = 13$
43. $c = 2\frac{1}{5}$
44. $s = -4\frac{3}{4}$
45. $t = 5$
46. $2(13 + w) = 46$
$w = 10$

The width of the rectangle is 10 cm.

47. a) $2(9 + a + 6) = 52$
    b) $a = 11$
    The length of side a is 11 cm.
48. a) Let c represent the price of an unlimited ride ticket, in dollars.
    $11(c + 8) = 319$
    b) $c = 21$
    The price of the ticket was $21.
49. $x = -2$
50. $x = 3\frac{1}{4}$
51. $y = 9$
52. $x = 5$
53.

x	–4	–3	–2	–1	0
y	–8	–7	–6	–5	–4

54.

x	1	2	3	4	5
y	7	11	15	19	23

55.

x	0	1	2	3	4
y	6	11	16	21	26

56.

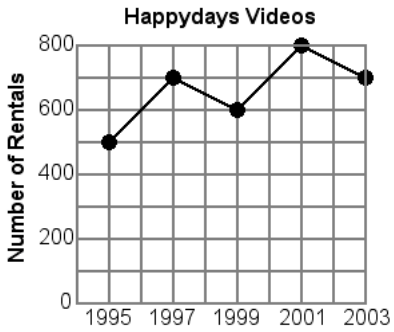
x	–3	–2	–1	0	1	2	3
y	11	10	9	8	7	6	5

57. D(9, –20) is not in the relation.
58. Iris has $140 in her account after 4 weeks.
59. It will take Harry 5 months to have $185 in his account.
60. $b = 12$

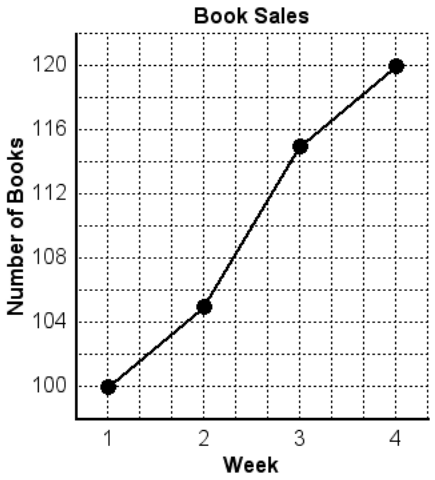
Chapter 7

1. Answers will vary. Sample:
   a) There are 8 students who got an A.
   More students got B than any other grade.
   There are 33 students in the class.
   b) You cannot tell how many boys or girls are in the class.
2. Answers will vary. Sample:
   a) Action movies are the most popular.
   Science fiction movies are the least popular.
   Musical movies and Comedy are preferred by half of the students.
   b) You cannot tell the number of students surveyed.
3. Answers may vary. Sample:
   Boys are in general faster than girls.
   The graph suggests a large time difference between boys' times and girls' times, but the actual difference is less than 1 s.
   The patterns of winning times for boys and for girls over the 5 years are roughly the same.
4. Answers may vary. Sample:
   Graph A: The line graph shows the increasing trend.
   Graph B: The bar graph shows the actual attendance numbers.
5. Answers may vary. Sample:
   A bar graph would clearly show the number of students selecting each activity.
6. Answers may vary. Sample:
   a) The greatest sales happen in May.
   About the same number of skateboards are sold in March and in June.
   b) About one-quarter of the skateboards are sold in April.
   February is the month with the poorest sales.
   c) In Graph A, you cannot compare the sales of each month to the total sales over the 5 months.
   In Graph B, you cannot tell the number of skateboards sold in each month.
7. Answers may vary. Sample:
   a) 16 students spent 5 to 8 hours on exercise while 14 did not exercise at all.
   8 students exercised for 9 or more hours.
   b) 10 students spent 1 to 4 hours on exercise while 14 did not exercise at all.
   8 students exercised for 9 or more hours.
   c) In either graph, you cannot tell the fraction or percent of students not exercising at all.
8. Answers may vary. Sample:
   a) iv)
   b) iii)
   c) i)
   d) ii)

9. Answers may vary. Sample:
   A line graph showing the trend or a bar graph showing the actual sales.
10. Answers may vary. Sample:
    A line graph with 1 line for each team showing the trends or a bar graph showing cumulative scores over the 4 months.
11. I would use Graph A as the decrease in profits looks smaller.
12. No, you cannot tell the actual time spent on each activity from these graphs.
13. Answers may vary. Sample:
    a) Town A
    b) Town D
    c) The break in the horizontal axis exaggerates the differences in population between towns.
14. Answers may vary. Sample:
    The intervals on the horizontal axis are unequal. The larger interval make the graph look as if the number of new clients is increasing steadily.
15. Graphs may vary. Sample:



16. Answers may vary. Sample:
    Graph B is misleading.
    The scale on the horizontal axis distorts the differences between the bars on the graphs.
17. Answers may vary. Sample:
    a) The vertical scale starts at 4.6. This makes the graph look as if the expenditures are decreasing rapidly.
    b) Redraw the graph, starting the vertical scale at 0.
18. Answers may vary. Sample:
    Start the vertical scale at 0 and use a much larger interval such as 20 customers instead of a small interval of 1 customer.
19. Graphs may vary. Sample:



20. Answers may vary. Sample:
    a) The size of the bars gives a false impression that the cost of a pizza at Big Al's is about half the cost of a pizza at Mama Mia's. Actually, the cost of a pizza is $7.50 at Big Al's and $10.00 at Mama Mia's. The difference is only $2.50.
    b) Big Al's can use this graph to give a false impression that it is charging only half of how much Mama Mia charges for a pizza.
21. There are 3 possible combinations.
22. P(tails and tails) = $\frac{1}{4}$
23. P(even and even) = $\frac{1}{4}$.
24. There are 9 possible dinners: beef and spinach; beef and broccoli; beef and carrots; chicken and spinach; chicken and broccoli; chicken and carrots; fish and spinach; fish and broccoli; fish and carrots.
25.

26. P(2 numbers the same) = $\frac{1}{6}$

27. P(even and red) = $\frac{1}{8}$

28. P(prime and purple) = $\frac{1}{8}$

29. ANS:

    a) P(red and red) = $\frac{25}{144}$

    b) P(not red and not yellow) = $\frac{7}{18}$

30. P(7 and heads) = $\frac{1}{18}$

31. P(4 on yellow, 2 on purple, and 7 on green) = $\frac{1}{512}$

32. P(D, even number, and B) = $\frac{1}{50}$

33. P(win a prize 4 times) = $\frac{1}{20\,736}$

34. a) P(even sum) = 0
    b) P(odd sum) = 1

35. P(all heads) = $\frac{1}{4}$

36. P(3 face cards in a row) = $\frac{27}{2197}$

37. P(club, red, and ace) = $\frac{1}{104}$

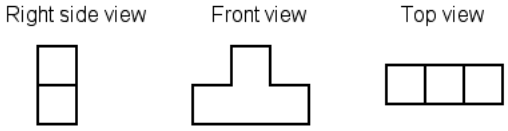
38. P(green, even, and tails) = $\frac{1}{16}$

39. P(blue 5 times in a row) = $\frac{1}{3125}$

40. Probability = $\frac{6}{16} = \frac{3}{8}$, or 37.5%.

Chapter 8

1.



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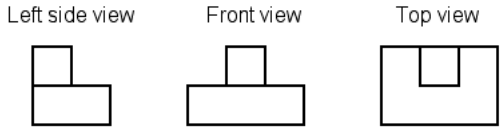

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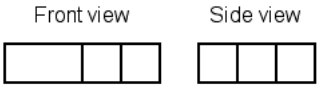
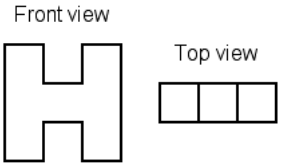


4.



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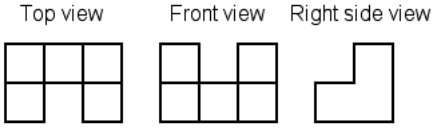

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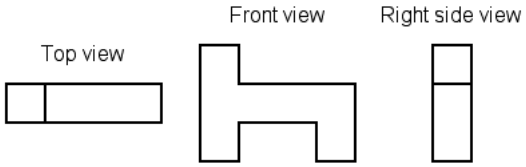

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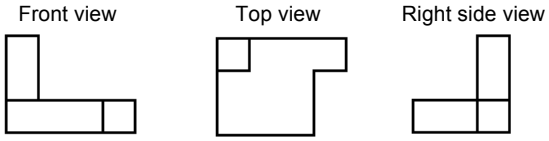

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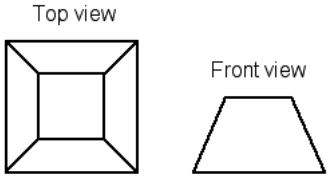

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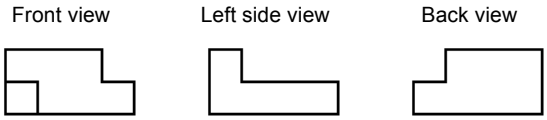

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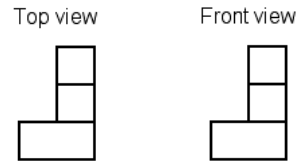
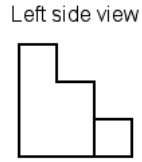
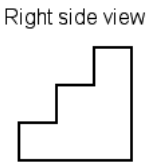
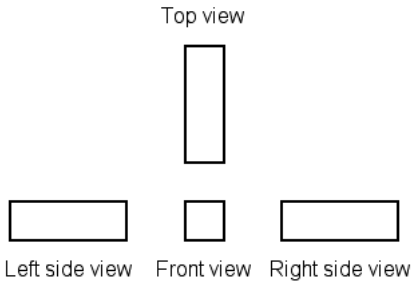






11.



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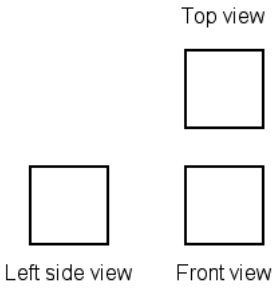
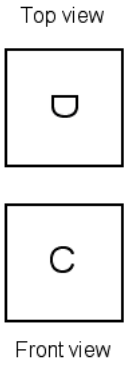
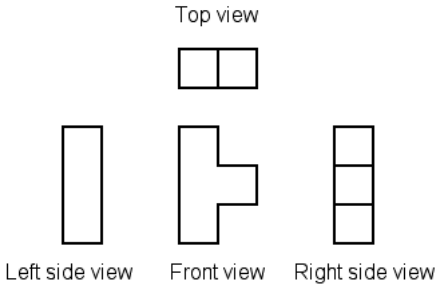


13.

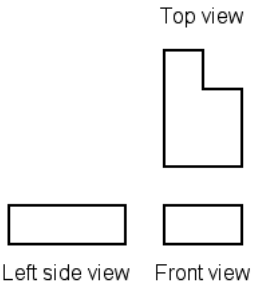


14. a) A horizontal rotation of 90° clockwise about the vertical axis.
    b) A horizontal rotation of 180° about the vertical axis.

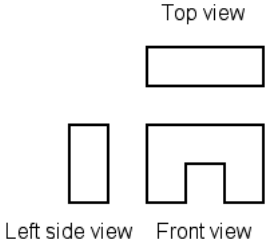
15.



16.



17.



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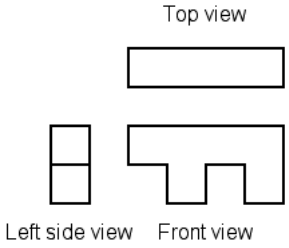

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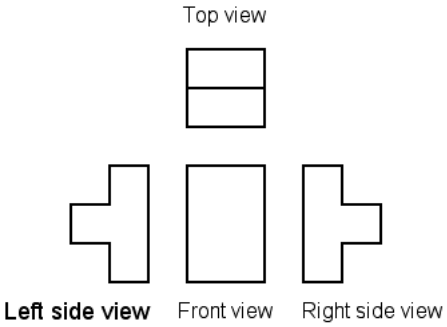
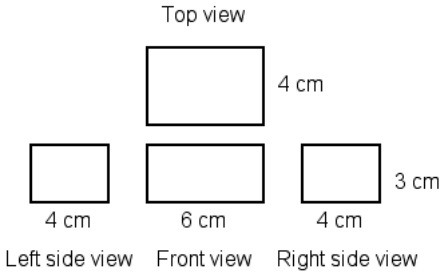


20. Diagrams may vary. Sample:



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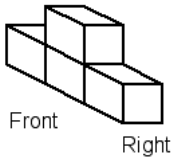

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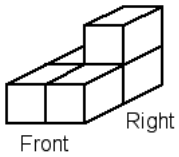

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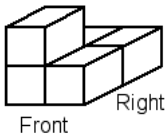

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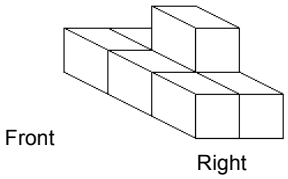

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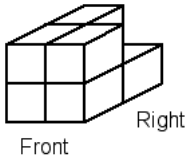

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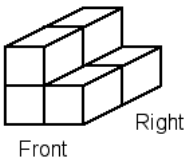
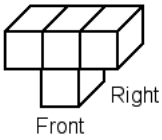
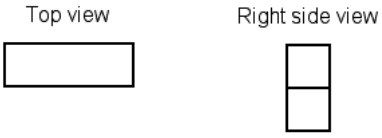


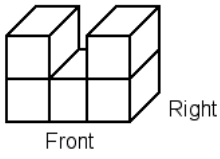
27. a)



b)

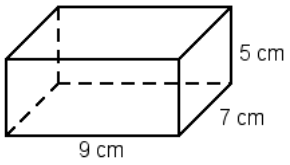


28.



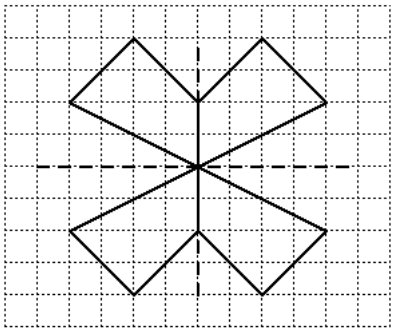
29. Answers may vary. Sample:
One possible answer is a cube.
Another possible answer is a 3 by 3 by 3 cube with the corner cubes removed as shown.

30.



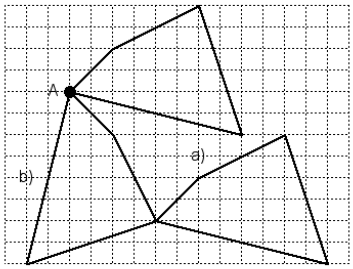
31. a) Translation 6 units right or reflection in the line XY
    b) 90° counterclockwise rotation about point X
    c) Reflection in the line AB
32. a) 90° counterclockwise rotation about the vertex the triangles share.
    b) Translation 2 units right and 2 units down.
33. a) Reflection in Line l
    b) Translation 8 units right and 2 units down or rotation of 180° about the meeting point of Lines l and Line k
    c) Reflection in Line k

34.

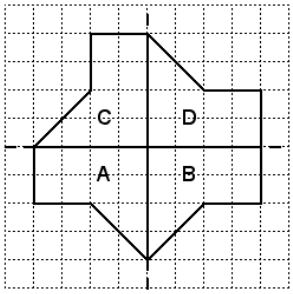


    b) 180° rotation about point O
    c) 90° clockwise rotation about point O
36. 90° counterclockwise rotation about P
37. • Translation 6 units right and 2 units up
    • 180° rotation about point J

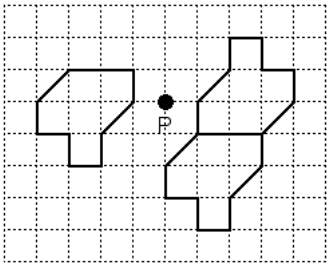
38.



39. a)

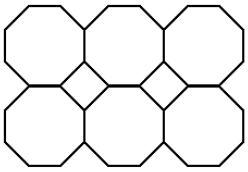


    b) 90° clockwise rotation about point O
40. a) and b)



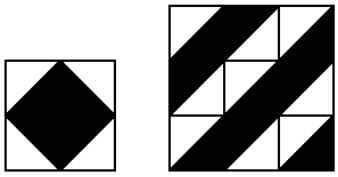
41. A square
42. All polygons except polygon C tessellate.
43.

44.



At each point where the vertices meet, the sum of the angle measures is 360°.

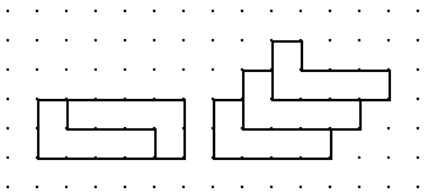
45. Answers my vary. Sample:



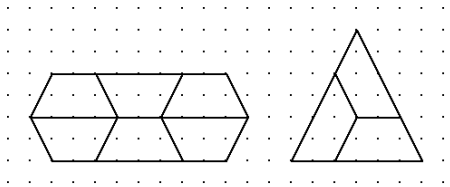
46. a) Polygons that tessellate are:
    - Equilateral triangle
    - Square
    - Rectangle
    - Rhombus
    - Regular hexagon

    b) A regular pentagon needs a rhombus to fill the gaps.
    A regular octagon needs a square to fill the gaps.

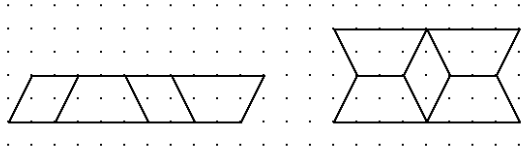
47. Answers may vary. Sample:



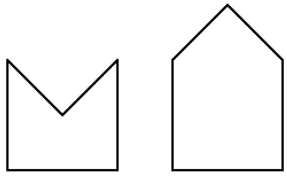
48. Answers may vary. Sample:



49. Answers may vary

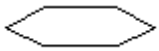


50. Answers my vary. Sample:

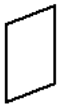


51.

52.



53. Answers may vary. Sample:



54. a) A regular octagon and a square
    b) Repeated translations of the octagon and the square

55. Answers may vary. Sample:
    a) Three equilateral triangles of different sizes
    b) Repeated translations of the 3 different equilateral triangles

56. Answers may vary. Sample:
    a) A regular octagon and an isosceles triangle
    b) Repeated translations of the regular octagon; repeated 180° rotations and translations of the isosceles triangle

57. a) Translation 3 units right
    b) 180° rotation about the midpoint of the side the 2 shapes share
    c) 180° rotation about the midpoint of the side the 2 shapes share

58. a) Reflection in the horizontal line through 3 on the vertical axis
    b) 180° rotation about point (2.5, 4.5)
    c) Translation 4 units right

59. - Translation 3 units left and 1 unit up
    - 180° rotation about the vertex the 2 shapes share

60. Answers may vary. Sample:
    - Translations and rotations
    - Rotations and reflections