Unit 1 – Square Roots & Surface Area

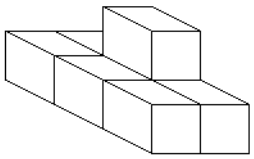
1. Determine the value of $\sqrt{0.09}$.

   a. 0.3 b. 0.045 c. 0.0225 d. 0.03

2. Calculate the number whose square root is 8.1.

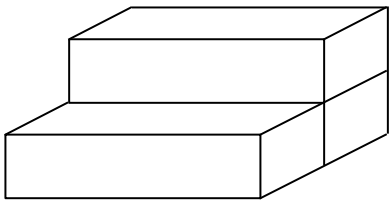
   a. 0.9 b. 32.4 c. 65.61 d. 81

3. This object is made from 7 centimetre cubes. Determine its surface area.



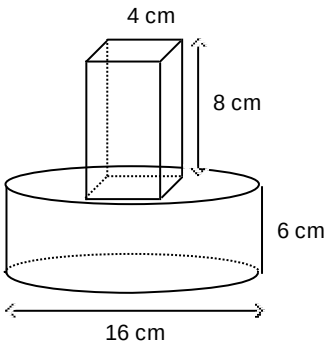
   a. 20 cm^2 b. 28 cm^2 c. 42 cm^2 d. 26 cm^2

4. This object is made from 3 identical right rectangular prisms.
   Each prism is 55 cm long and has square ends of side length 25 cm.
   What is the surface area of the object?



   a. 20 250 cm^2 b. 12 875 cm^2 c. 12 000 cm^2 d. 14 750 cm^2

5. This object is composed of a rectangular prism on top of a cylinder.
   The rectangular prism has height 8 cm and square ends of side length 4 cm.
   The cylinder has diameter 16 cm and height 6 cm.
   Determine the surface area of the object, to the nearest square centimetre.

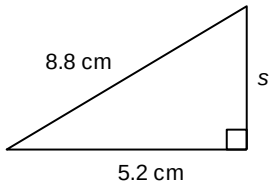


a. 631 cm^2 b. 816 cm^2 c. 832 cm^2 d. 848 cm^2

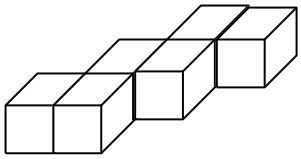
6. Calculate the number whose square root is $\frac{12}{13}$.

7. Determine the value of $\sqrt{6 \times 3 \times 18}$.

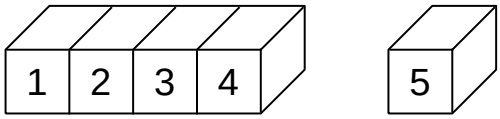
8. Determine the length of side *s*.



9. This composite object is made using centimetre cubes. Determine its surface area.



10. Five centimeter cubes are labelled 1 to 5 as shown.



Determine the surface area of the object formed by placing Cube 5 on top of each indicated cube.

a) Cube 1

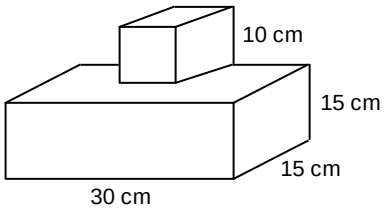
b) Cube 2

c) Cube 3

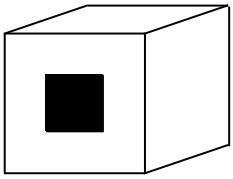
d) Cube 4

What do you notice about the answers?

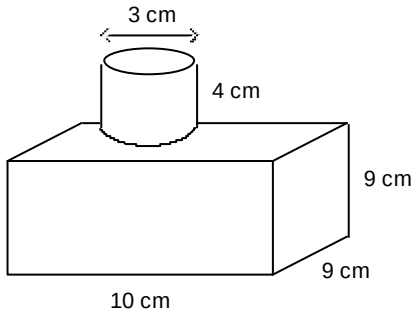
11. This object is composed of a cube on top of a right rectangular prism.
Determine the surface area of the object.



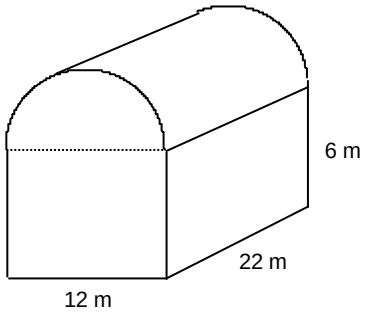
12. This wooden block is in the shape of a cube with side length 30 cm. A 10-cm square hole is cut through the block. Determine the total surface area of the block.



13. Determine the surface area of this composite object, to the nearest square centimetre.
The cylinder has diameter 3 cm and height 4 cm.
The prism has length 10 cm, width 9 cm, and height 9 cm.



14. A barn is built in the shape of a right rectangular prism with a semi-circular roof.
Determine the surface area of the barn. Give your answer to the nearest whole number.



15. Each layer of a three-layer cake is a cylinder of height 8 cm.
The bottom layer has diameter 28 cm.
The middle layer has diameter 24 cm.
The top layer has diameter 20 cm.
The surface of the cake is frosted. What area of the cake is frosted?
Be sure to include a diagram as part of your solution, in the space provided below.

Unit 2 – Powers & Exponent Laws

1. Which power is positive?

   i) $(6)^5$
   ii) $(-6)^5$
   iii) $-(6)^5$
   iv) $-(-6)^5$

   a. i and iv b. iii and iv c. i, ii, and iv d. i and ii

2. Evaluate: -8^0

   a. 8 b. 0 c. 1 d. –1

3. Which number is the greatest?

   i) $(5 \times 10^3) + (6 \times 10^2) + (4 \times 10^1) + (7 \times 10^0)$
   ii) 5645
   iii) $(5 \times 10^3) + (7 \times 10^2) + (8 \times 10^0)$
   iv) 5780

   a. iv b. i c. iii d. ii

4. Evaluate: $(-3 \times 6)^2$

   a. -324 b. 324 c. -36 d. 9

5. Evaluate: $6^5 - 3^3$

   a. 6561 b. 9 c. 7749 d. 21

6. Evaluate: $(5^3 - 4^2)^0 - (6^2 - 8^0)$

   a. –34 b. –35 c. -36 d. 73

7. Which is the correct value of $3^2 + 4 \times 6 - 4$?

i) 26
ii) 17
iii) 29
iv) 74

a. i b. iii c. iv d. ii

8. Which expression has a value of 0?

i) $-(-7)^0 + 2 \times (-5)^0 - (-4)^0$
ii) $(7 \times 5)^0 - (5 - 4)^2 + (8 - 5)^0$
iii) $5 - (4 \div 4)^2 - (-8)^0$
iv) $(4 \times 4 \div 8) - (5^2 - 7^2)^0 - (-7)^0$

a. ii and iii b. i, iii, and iv c. i, ii, and iv d. i and iv

9. Evaluate: $\dfrac{(5)^8 \times (5)^6}{(5)^{12}}$

a. 10 b. 4 c. 2 d. 25

10. Write $\left(\dfrac{7}{3}\right)^3$ as a quotient of powers.

a. $\dfrac{7^3}{3^3}$ b. $\dfrac{7^3}{3^1}$ c. 4^3 d. $7^3 - 3^3$

11. Which expressions have negative values?

i) $\left[-(-4)^3\right]^3$

ii) $\left(-4^3\right)^3$

iii) $\left[(-4)^3\right]^3$

iv) $-\left[(-4)^3\right]^3$

a. ii and iii b. i and iv c. i and ii d. iii and iv

12. Write the base and the exponent of this power: $(8)^7$

13. Write these powers in order from least to greatest.

$2^5, 4^3, 3^4, 5^2$

14. Write 805 076 using powers of 10.

15. Write $(2 \times 10^4) + (5 \times 10^2)$ in standard form.

16. State which operation you would do first to evaluate $(-4)^2 + 3 \times 7$.

17. Determine the first 4 terms of this pattern: $3^n - 3^{n-1}$

What is the 7th term?

18. Insert brackets to make each statement true.

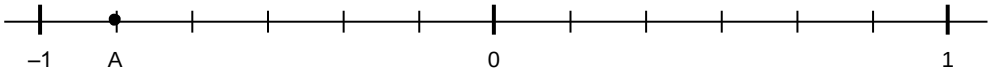
a) $3^2 + 4 \times 5 - 2^2 = 13$

b) $3^2 + 4 \times 5 - 2^2 = 61$

19. Evaluate: $(-2)^6 \div (-2)^5 - (-3)^5 \div (-3)^0$

Unit 3 - Rational Numbers

1. Which rational number is represented by the letter A on the number line?



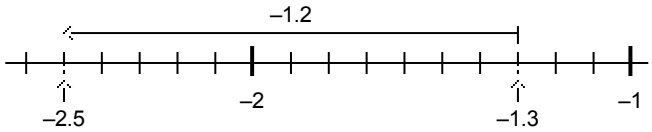
a. –0.5

b. –0.8

c. –5

d. $-\frac{5}{6}$

2. Write the addition statement that this number line represents.



a. $-2.5+(-1.2)=-1.3$

b. $-2.5+1.2=-1.3$

c. $-1.3+(-1.2)=-2.5$

d. $-1.3+2.5=-1.2$

3. A student first borrowed $40.25, then borrowed another $15.75 from his father. He then paid back $20.75. How much does he still owe his father?

a. $3.75 b. $45.25 c. $24.50 d. $35.25

4. Which numbers below would make this sentence true?

$-5.4+\square \leq -1.5$

i) 3.9

ii) 4.9

iii) 3.5

iv) 4.4

a. ii and iv b. i and iv c. i and iii d. ii and iii

5. Yesterday, the temperature of a freezer was -4.4 degrees Celcius. When the technician checked the freezer today, its temperature had decreased by 9.8 degrees Celcius . Determine the temperature of the freezer today.

a. $-5.4°C$ b. $5.4°C$ c. $14.2°C$ d. $-14.2°C$

6. Which expressions have the same answer as $-1\frac{\dot{2}}{3} - (-5)$?

i) $5 + 1\frac{\dot{2}}{3}$

ii) $-5 + 1\frac{\dot{2}}{3}$

iii) $-1\frac{\dot{2}}{3} + 5$

iv) $5 - 1\frac{\dot{2}}{3}$

a. iii and iv b. ii and iv c. i and ii d. i and iii

7. Which products are less than 0?

i) $(-0.6) \times (1.1)$

ii) $(-2.3) \times (-1.8)$

iii) $(-1.2) \times (-0.7)$

iv) $(1.5) \times (-1.8)$

a. ii b. i, iii, and iv c. i and iv d. ii and iii

8. Determine this product.

$$\left(-4\frac{1}{3}\right)\left(1\frac{4}{5}\right)$$

a. $7\dot{\frac{4}{5}}$ b. $2\dot{\frac{8}{15}}$ c. $-2\dot{\frac{8}{15}}$ d. $-7\dot{\frac{4}{5}}$

9. The price of a share changed by - $1.45. A person owns 190 shares. By how much did his shares change in value?

a. -$85.50 b. -$275.50 c. +$275.50 d. -$131.03

10. Which expressions have the same answer as $(-0.53) \div 0.62$?

i) $5.3 \div (-6.2)$

ii) $(-53) \div (6.2)$

iii) $53 \div (-0.062)$

iv) $0.0053 \div (-0.0062)$

a. ii and iv b. i and iii c. ii and iii d. i and iv

11. Determine this quotient.

$$\dot{3}\dot{1}\dot{4} \div \left(-\frac{15}{4}\right)$$

a. $-\dot{2}\dot{3}\dot{5}$ b. $-\dot{5}\dot{6}$ c. $-\dot{4}\dot{5}\dot{6}$ d. $-\dot{3}\dot{5}\dot{2}$

12. At a harbour, the effect of the tide changed the water level by 14.3 m in 5.5 h. What was the mean change in water level per hour?

a. -2.6 m/h b. -19.8 m/h c. -78.65 m/h d. -8.8 m/h

13. Evaluate.

$$\frac{5}{6} - \frac{2}{3} \times \frac{3}{4} + \frac{5}{6}$$

a. -4 b. $-\dot{1}\dot{7}\dot{2}$ c. $\dot{7}\dot{6}$ d. $\dot{5}\dot{7}$

14. A student has $1298 in her savings account. She withdraws $95 each week. A formula for calculating the amount of money remaining in her account is $A = T - 95w$, where *T* dollars is the original amount and *w* is the number of weeks she has been withdrawing money.

Determine the amount of money remaining in her account after 13 weeks.

a. $63 b. $1235 c. $1216 d. $1190

15. Order these numbers from greatest to least.

$-1\dot{1}\dot{7}$, 1.2, $-1\dot{1}\dot{4}$, $1\dot{2}\dot{5}$, -1.4

16. Determine this difference.

$92.72 - (-49.57)$

17. Evaluate. Give your answer to the nearest hundredth.

$$\frac{3.6 - 3.9 \div (-2.6)}{(-5.2 + 1.5)^2}$$

18. Calipatria, California, USA is 0.086 km below sea level; Winnipeg, Manitoba is 0.238 km above sea level; and Kimberly, British Columbia is 1.113 km above sea level.

    a) Represent the elevation of each city above or below sea level as a rational number.

    b) Sketch and label a vertical number line to show the sea level and the elevation of each city.

    c) Which city's elevation is closest to sea level? Explain your reasoning.

    d) Which city has the greatest elevation? How do you know?

19. Evaluate this expression. Show your work.

$$-2\frac{3}{4} - (-4\frac{1}{3}) - 2\frac{5}{6}$$

20. a) On Monday, the price of a share in an oil company changed by -$1.27.
Karen owns 120 shares in the oil company.
By how much did the shares change in value on Monday?

b) On Monday, the price of a share in a gas company changed by $1.43.
Karen owns 190 shares in the gas company.
By how much did the shares change in value on Monday?

c) Calculate Karen's overall gain or loss on Monday.

21. Find the errors in this solution. Write a correct solution.

$$1.7 \times (4.6 - 2.1) + 3.5 \times 1.3$$
$$= 1.7 \times 2.5 + 3.5 \times 1.3$$
$$= 1.7 \times 6 \times 1.3$$
$$= 13.26$$

22. Fashid was checking his stocks to see if he had gained or lost.
The list shows the number of each stock and the change in its value.
Has Fashid gained or lost money? Explain.

Stock	**Number of Shares**	**Change in Price per Share ($)**
1	230	+1.56
2	380	–2.17
3	170	+3.63
4	260	–0.88
5	340	–1.74

Unit 4 - Linear Relations

1. In a table of values for a pattern, $P = 12$ when $n = 3$. Determine the equation that might represent the pattern.

   a. $P = 4n + 6$ b. $P = 24 - 3n$ c. $P = 4(6 - n)$ d. $P = 4(n + 6)$

2. This pattern of unit squares continues. Which equation below relates the number of squares, n, to the figure number, f?

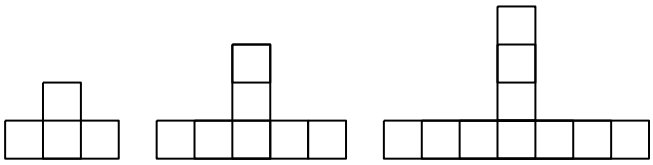


Figure 1 Figure 2 Figure 3

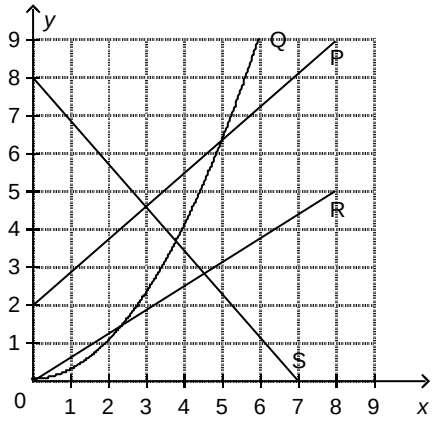
i) $n = 3f + 4$
ii) $n = 3f + 1$
iii) $f = 3n + 1$
iv) $f = 4 + 3n$

   a. iii b. ii c. iv d. i

3. The cost to rent a piece of equipment is $24, plus $8.27 per hour. Calculate the cost of renting the equipment for 6 h.

   a. $1190.88 b. $73.62 c. $193.62 d. $38.27

4. Which graphs represent a linear relation?



a. P only b. P, R, and S c. P and S d. P and R

5. Which tables of values represent a linear relation?

i)

x	1	2	3	4	5
y	4	7	12	19	28

ii)

x	0	1	2	3	4
y	0	5	10	15	20

iii)

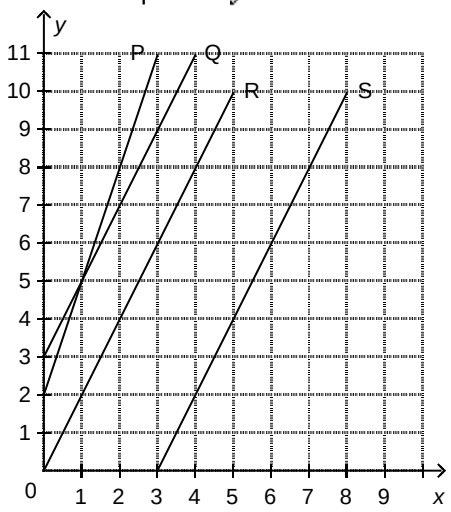
x	1	2	3	4	5
y	5	9	13	17	21

iv)

x	0	1	2	3	4
y	12	11	10	9	8

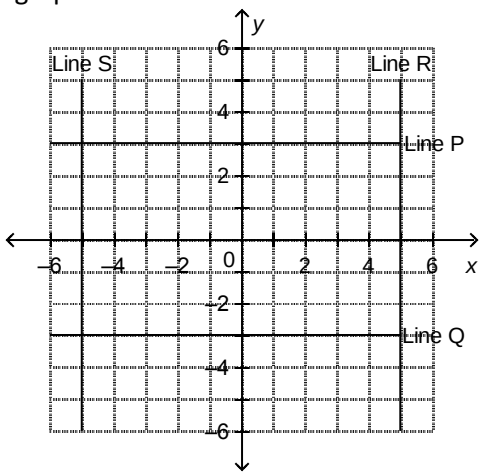
a. ii, iii, and iv b. ii and iii c. All of these d. i and iv

6. Which graph represents the equation $y = 2x + 3$?



a. Line S b. Line Q c. Line P d. Line R

7. Which line is the graph of $x + 5 = 0$?



a. Line R b. Line Q c. Line P d. Line S

8. Which equations describe vertical lines?

i) $x + 5 = 12$
ii) $y - 12 = 5$
iii) $x + y = 5$
iv) $12x = 5$

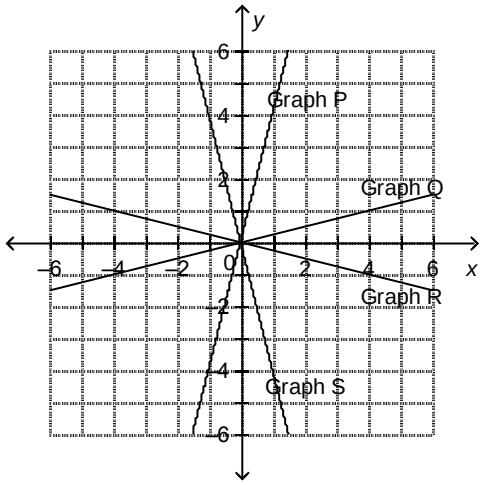
a. i and iii b. ii and iii c. ii and iv d. i and iv

9. Which equations describe oblique lines?

i) $5x + 9 = 14$
ii) $5x + 9y = 14$
iii) $9y + 5 = 14$
iv) $5x = 9y$

a. iii and iv b. ii and iv c. i and iii d. i and iv

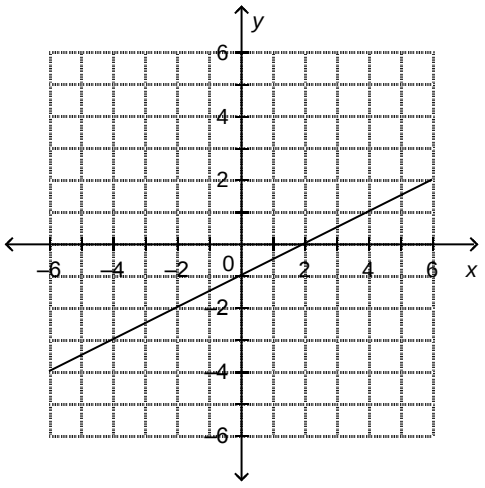
10. Which graph on this grid has the equation $y = -0.3x$?



a. Graph S b. Graph R c. Graph Q d. Graph P

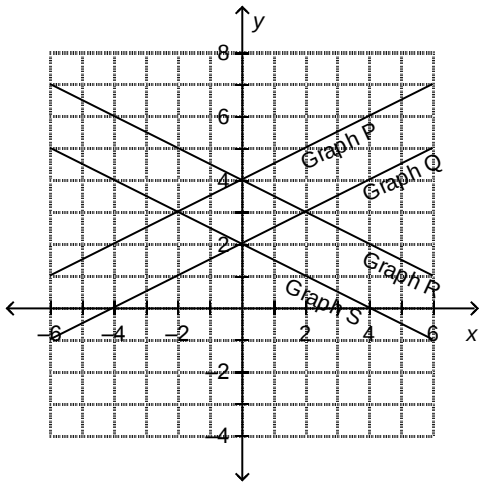
11. Which equation describes the following graph?

i) $y = \frac{1}{2}x + 1$
ii) $y = \frac{1}{2}x - 1$
iii) $y = -2x - 1$
iv) $y = 2x - 1$



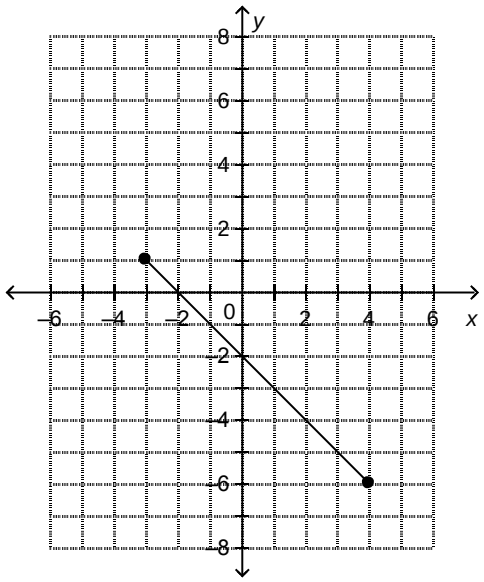
a. iii b. i c. ii d. iv

12. Which graph on this grid has the equation $x + 2y = 4$?



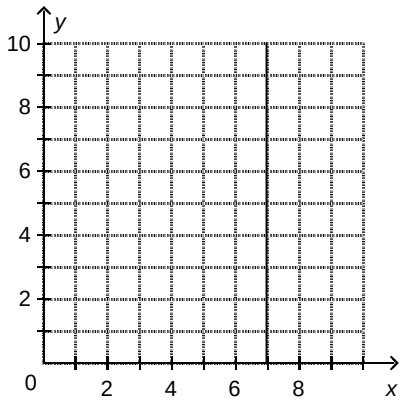
a. Graph Q b. Graph P c. Graph S d. Graph R

13. This graph represents a linear relation. Determine the value of *y* when *x* = –5.



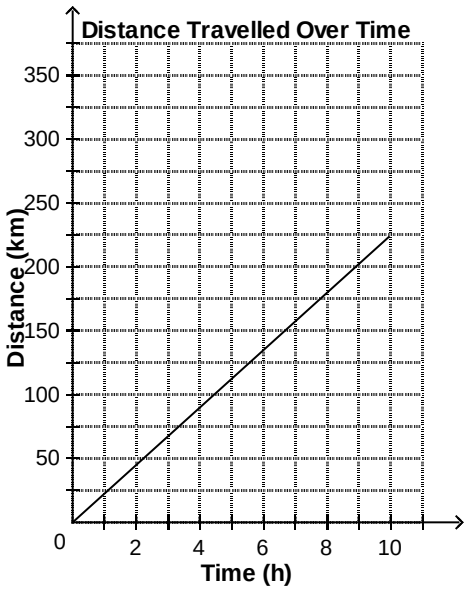
a. 7 b. 3 c. 1 d. 2

14. This graph represents a linear relation. Determine the value of x when $y = 5$.



a. 12 b. 5 c. 0 d. 7

15. A car travels at a constant speed.
The graph shows how the distance of the car changes with time.
Estimate the time it takes to travel 270 km.



a. 1 h b. 12 h c. 13 h d. 11 h

16. The cost of a taxi ride is the sum of a fixed cost of $2.50 for the first kilometre, plus $1.75 for each additional kilometre.

a) Write an equation that relates the cost of a taxi ride, *F* dollars, to the distance travelled, *n*.

b) Determine the cost of a 28-km taxi ride.

17. Here is a pattern made with toothpicks.
The pattern continues.

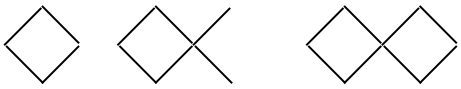


Figure 1 Figure 2 Figure 3

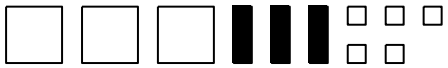
a) Write an equation that relates the number of toothpicks, *N*, to the figure number, *n*.

b) How many toothpicks are needed for figure 80?

Unit 5 - Polynomials

1. A large white square represents an x^2-tile, a black rectangle represents a -x-tile, and a small white square represents a 1-tile.

   Write the polynomial represented by this set of algebra tiles.



a. $3x^2 - x^3 + 5$ b. $-3x^2 + 3x + 5$ c. $3x^2 - 3x + 5$ d. $3x - 3x^2 + 5$

2. Identify the polynomials that can be represented by the same set of algebra tiles.

   i) $3x^2 - 2 + 6x$
   ii) $3x^2 - 6x + 2$
   iii) $-2 + 6x - 3x^2$
   iv) $6x - 2 + 3x^2$

a. iii and iv b. i and iv c. ii and iv d. i and ii

3. Identify the polynomial that is equivalent to $4 - 6v - 7v^2$.

   i) $7v^2 + 6v - 4$
   ii) $4 + 7v^2 - 6v$
   iii) $-7v^2 - 6v + 4$
   iv) $-7v^2 - 4 + 6v$

a. iv b. ii c. i d. iii

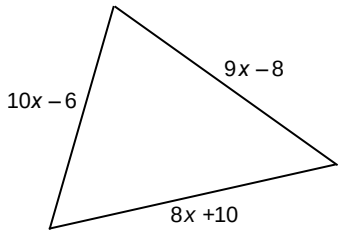
4. Simplify: $10x^2 - 8 + 3x + 5 - 6x^2 - 6x$

a. $4x^2 - 3x + 3$
b. $4x^2 - 3x - 3$
c. $4x^2 + 3x + 3$
d. $4x^4 - 3x^2 - 3$

5. Add: $(8x-6)+(-4x-2)$

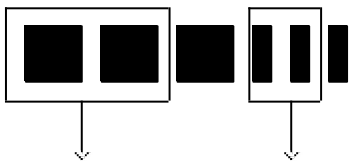
a. $4x-8$ b. $4x-4$ c. $12x-8$ d. $4x+4$

6. Write the perimeter of this triangle as a polynomial in simplest form.



a. $27x-24$ b. $27x+4$ c. $27x+24$ d. $27x-4$

7. A large black square represents a $-x^2$-tile and a black rectangle represents a $-x$-tile. Write the subtraction sentence that these algebra tiles represent.



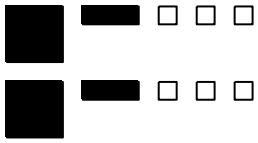
a. $(-2x^2-3x)-(-3x^2-2x)$
b. $(-3x^2-2x)-(-2x^2-3x)$
c. $(-2x^2-2x)-(-3x^2-3x)$
d. $(-3x^2-3x)-(-2x^2-2x)$

8. Subtract: $(3x-7x^2+2)-(4x^2-5+6x)$

a. $-11x^2+3x-7$
b. $-11x^2-9x-3$
c. $-11x^2-3x+7$
d. $11x^2+3x-7$

9. A large black square represents a $-x^2$ tile, a black rectangle represents an –*x*-tile, and a small white square represents a 1-tile.

What is the division sentence modelled by this set of algebra tiles?

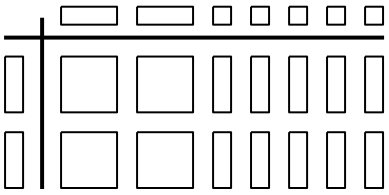


a. $\frac{-32x^2 - 32x + 16}{2}$ b. $\frac{-2x^2 - 2x + 6}{2}$ c. $\frac{-32x^2 + 32x + 48}{16}$ d. $\frac{2x^2 - 2x + 6}{2}$

10. A large white square represents an x^2-tile, a white rectangle represents an *x*-tile, and a small white square represents a 1-tile.

Which of these multiplication sentences is modelled by the algebra tiles below?

i) $2x(2x + 5)$
ii) $2(2x^2 + 5)$
iii) $x(2x + 5)$
iv) $2x(4x^2 + 10x)$



a. iii b. ii c. i d. iv

11. Divide: $\frac{-12x^2}{3x^2}$

a. -4*x* b. -9*x* c. -4 d. -9

12. Multiply: $-4c(2c-3)$

a. $-2c^2+7$ b. $-8c^2-3$ c. $-8c^2-12c$ d. $-8c^2+12c$

13. Divide: $\frac{-20p^2-16p}{-4p}$

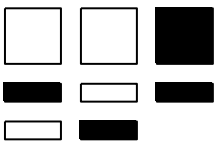
a. $5p^2-16p$ b. $5p+4$ c. $80p^2-64$ d. $5p+4p$

14. What algebra tiles would you use to model the polynomial $3x^2-4x-9$?

15. Name the coefficients, variable, degree, and constant term in the polynomial $6x^2-5x+8$.

16. A large white square represents an x^2-tile, a large black square represents a $-x^2$-tile, a white rectangle represents an x-tile, and a black rectangle represents a $-x$-tile.

Write the simplified polynomial.



17. Use algebra tiles to subtract: $(7x^2 - 6) - (4x^2 - 11x + 3)$

18. Use algebra tiles to multiply: $5(-2x^2 - 5)$

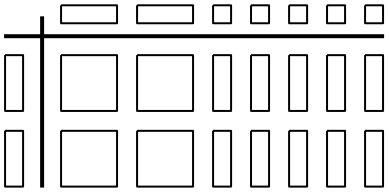
19. Use algebra tiles to divide: $(15d^2 - 12d) \div (-3)$

20. Identify the errors in this student's solution for the following question:

$$(8x^2 - 10x - 2) \div (-2)$$
$$= \frac{8x^2}{-2} + (\frac{-10x}{-2}) + (\frac{-2}{-2})$$
$$= -4x^2 + (-5x) + (-0)$$
$$= -4x^2 - 5x$$

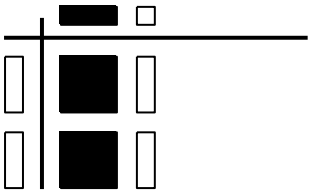
21. A large white square represents an x^2-tile, a white rectangle represents an x-tile, and a small white square represents a 1-tile.

Write a division sentence that is modelled by these algebra tiles.



22. A large black square represents a $-x^2$-tile, a white rectangle represents an x-tile, a black rectangle represents a $-x$-tile, and a small white square represents a 1-tile.

Write the multiplication sentence that is modelled by these algebra tiles.



23. Use algebra tiles to add: $(3x^2 - 4x) + (3x^2 + 8x - 12)$

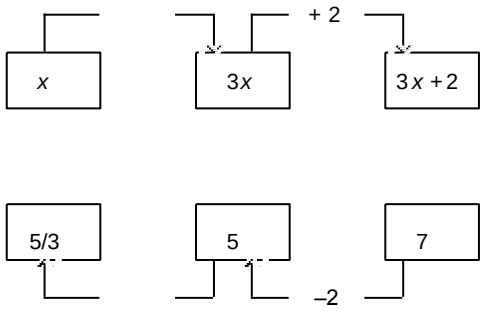
24. A student added $(8x^2 - 6x + 13) + (-13x + 6x^2 - 8)$ as follows:

$$
\begin{aligned}
&(8x^2 - 6x + 13) + (-13x + 6x^2 - 8) \\
&= 8x^2 - 6x + 13 + 13x + 6x^2 - 8 \\
&= 8x^2 + 6x^2 - 6x + 13x + 13 - 8 \\
&= 14x^2 + 7x + 5
\end{aligned}
$$

Is the student's work correct? If not, explain where the student made any errors and write the correct answer

Unit 6 - Linear Equations and Inequalities

1. What are the missing values in this arrow diagram?



a. ÷3; ÷3 b. x3; x3 c. ÷3; x3 d. x3; ÷3

2. Write an equation for this statement: A number divided by 3, plus 8, is 11.

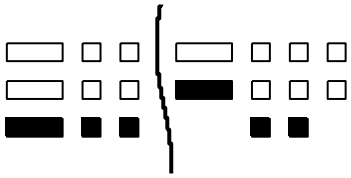
a. $\frac{x}{3} = 8 + 11$ b. $\frac{x}{3} + 8 = 11$ c. $\frac{3}{x} + 8 = 11$ d. $\frac{x+8}{3} = 11$

3. Solve: $4(x + 5) = 16$

a. 7 b. $\frac{11}{4}$ c. –1 d. –8

4. A white rectangle represents a +*x*-tile, a black rectangle represents a –*x*-tile, a small white square represents a +1-tile, and a small black square represents a –1-tile.

   Solve the equation represented by the algebra tiles.



   a. $x = 12$ b. $x = -2$ c. $x = 2$ d. $x = 1$

5. Solve: $3(3q - 2) = 2(2q + 5)$

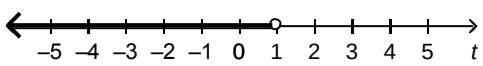
   a. $q = -\dot{5}\dot{1}\dot{6}$ b. $q = -3\frac{1}{5}$ c. $q = \dot{5}\dot{1}\dot{6}$ d. $q = 3\frac{1}{5}$

6. Solve: $\frac{x}{4} + \frac{11}{2} = \frac{7}{4}$

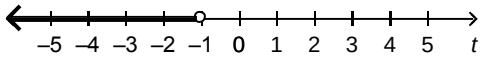
   a. $x = -4$ b. $x = -60$ c. $x = -8$ d. $x = -15$

7. Which of these graphs is a solution of $t \leq 1$?

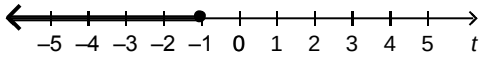
i)



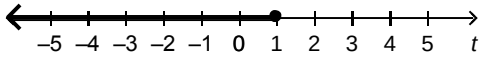
ii)



iii)

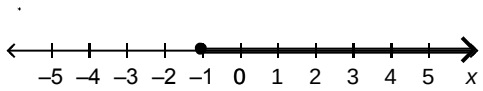


iv)



a. Graph i b. Graph iv c. Graph ii d. Graph iii

8. Write the inequality whose solution is graphed on the number line.



a. $x \geq 1$ b. $x > -1$ c. $x \geq -1$ d. $x > 1$

9. Which of these inequalities has -4 as a solution?

i) $p + 1 \leq -2$

ii) $q + 2 > -2$

iii) $r - 1 < -4$

iv) $s - 4 \geq -4$

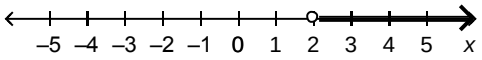
a. ii and iv b. i and ii c. i and iii d. i and iv

10. Solve: $3.9 \leq y - 1.4$

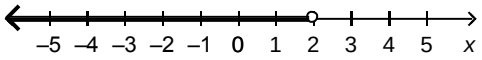
a. $y \geq 2.5$ b. $y \leq 5.3$ c. $y \geq 5.3$ d. $y \leq 2.5$

11. Which of these graphs represent the solution of the inequality $9 - 2x < 7$?

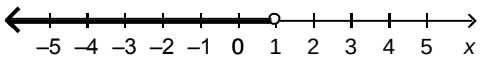
i)



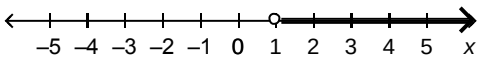
ii)



iii)



iv)



a. Graph iii b. Graph ii c. Graph iv d. Graph i

12. Solve: $\frac{m}{-3} < 7$

a. $m > -21$ b. $m < 21$ c. $m > 21$ d. $m < -21$

13. An equipment rental company charges a flat rate of $24, plus $14 per day for insurance. Kyle has $155. Write an inequality to represent the number of days, *d*, for which he can rent equipment.

a. $24 + 14d \leq 155$ c. $24 + 14d \geq 155$

b. $24 + 14d < 155$ d. $24 + 14d > 155$

14. Solve: $1.2b + 2.6 = 10.1 - 1.3b$

a. $b = 0.3$ b. $b = 3$ c. $b = -3$ d. $b = -0.3$

15. A rectangle has width 1.3 cm and perimeter 10.2 cm.

a) Write an equation that can be used to determine the length.

b) Solve the equation.

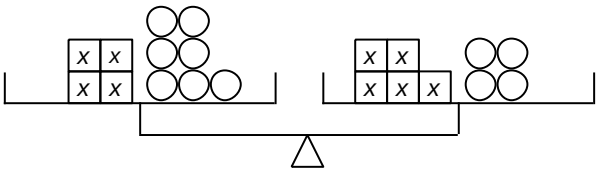
16. Here is a student's solution for this question:

Solve: $\frac{-5x}{4} = 2$

$$\frac{-5x}{4} = 2$$
$$\frac{-5x}{4} \times 4 = 2 \times 4$$
$$-5x = 6$$
$$-5x + 5 = 6 + 5$$
$$x = 11$$

Identify any errors in the solution.

17. Write the equation represented by this picture. Solve the equation.



18. Identify any errors made in the solution for this equation: $3(2x-5)=7-3x$

$$
\begin{aligned}
3(2x-5) &= 7-3x \\
6x-5 &= 4x \\
6x-5+5 &= 4x+5 \\
6x &= 4x+5 \\
6x-4x &= 4x+5-4x \\
2x &= 5 \\
x &= 2.5
\end{aligned}
$$

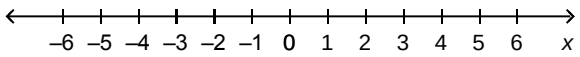
19. Define a variable and write an inequality to describe the following situation: The maximum seating capacity of a lecture hall is 240 people.

20. Solve: $8-3x<x+2$

21. Solve: $4x + 28 = 18$. Verify the solution.

22. Solve the inequality: $\frac{3}{4}x - \frac{5}{8}(1 - x) \leq \frac{1}{2}(3x - 0.5)$

Graph the solution.



Unit 7 - Similarity & Transformations

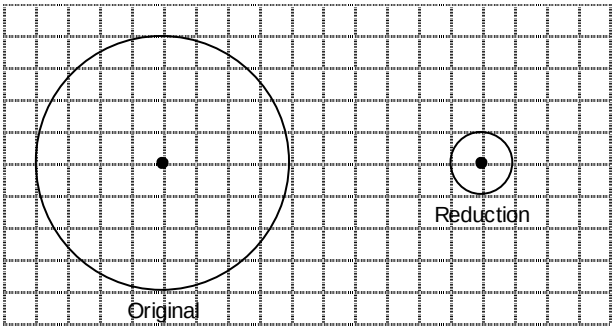
1. A rectangle has length 6 cm and width 4 cm.
   The rectangle is to be enlarged by a scale factor of 8.
   Calculate the length of the enlargement.

   a. 80 cm b. 48 cm c. 32 cm d. 14 cm

2. One frame of a film in a projector is 5 cm high.
   The film is projected onto a giant screen. The image of the film frame is 12 m high.
   What is the scale factor of this enlargement?

   a. 240 b. $\frac{1}{240}$ c. 2.4 d. 24

3. Determine the scale factor for this reduction.



   a. 8 b. 4 c. $\frac{1}{4}$ d. $\frac{1}{8}$

4. A model ship is built to a scale of 1:400.
   If the actual length of the ship is 45 m, determine the length of the model.
   Give your answer to the nearest tenth of a centimetre, if necessary.

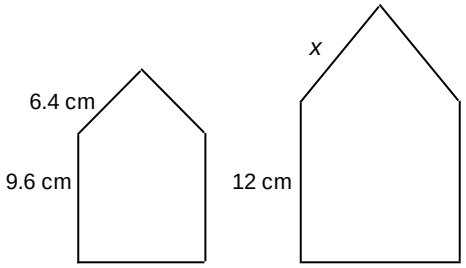
   a. 11.3 cm b. 35.5 cm c. 0.11 cm d. 8.9 cm

5. Identify similar rectangles with these dimensions:

a) 10 cm by 15 cm
b) 19 cm by 28 cm
c) 14 cm by 21 cm
d) 16 cm by 24 cm

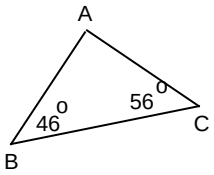
a. a, c, and d b. b, c, and d c. b and d d. a and b

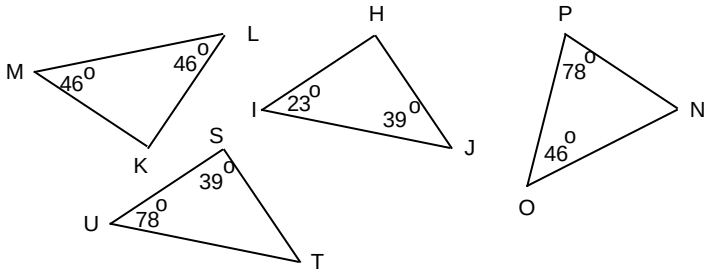
6. These two pentagons are similar. Determine the value of *x*.



a. 8 cm b. 1.9 cm c. 5.12 cm d. 18 cm

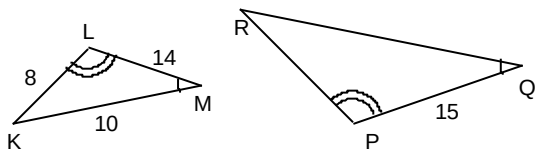
7. Which triangle is similar to ΔABC?





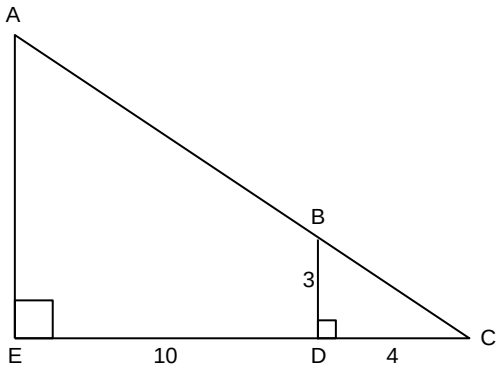
a. ΔHIJ b. ΔSTU c. ΔPON d. ΔKLM

8. These triangles are similar. Determine the length of QR to the nearest tenth.



a. 10.7 b. 12 c. 26.3 d. 18.8

9. Determine the length of AE in this pair of similar triangles.

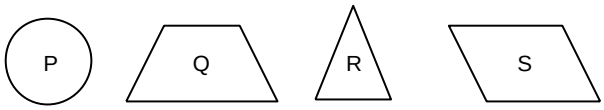


a. 3.3 b. 10.5 c. 7.5 d. 4.3

10. When the shadow of a flagpole is 31.2 m long, a 1.6-m fencepost casts a shadow 2.6 m long. How tall is the flagpole?

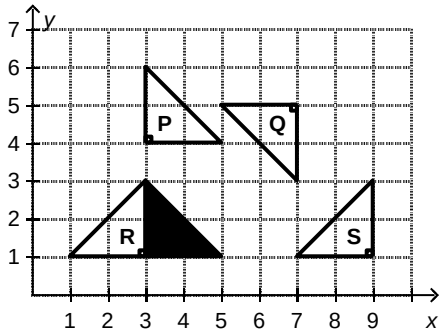
a. 50.7 m b. 12.6 m c. 19.2 m d. 19.2 m

11. Which shapes have exactly one line of symmetry?



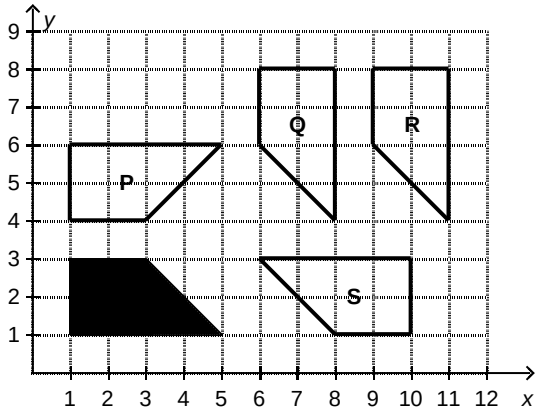
a. Shapes P, Q, R, S
b. Shapes P, S
c. Shapes Q, R
d. Shapes P, Q, R

12. Identify the triangles that are related to the black triangle by a line of reflection.



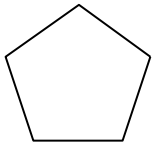
a. Triangles P, Q, R, S
b. Triangles Q, R
c. Triangles R, S
d. Triangles Q, R, S

13. Identify the quadrilaterals that are related to the black quadrilateral by a line of reflection.



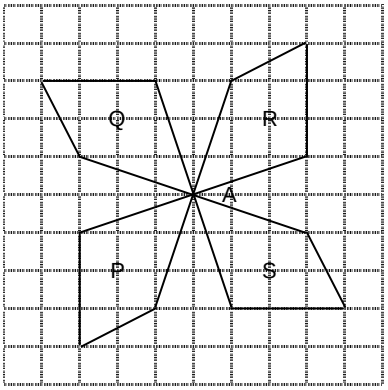
a. Quadrilaterals P, Q
b. Quadrilaterals P, Q, R, S
c. Quadrilaterals P, Q, R
d. Quadrilaterals P, Q, S

14. What is the order of rotational symmetry and angle of rotation symmetry for this regular pentagon?



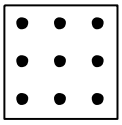
a. 5; 75° b. 6; 120° c. 5; 72° d. 5; 54°

15. Quadrilateral P is rotated 90° clockwise about vertex A, then 270° counter-clockwise about vertex A. Which quadrilateral shows the final position of quadrilateral P?



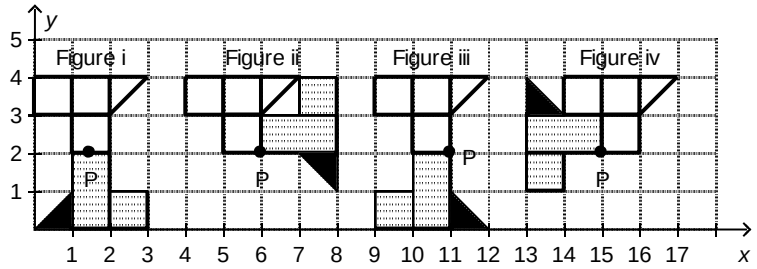
a. P b. S c. Q d. R

16. Describe the rotational symmetry and line symmetry of this diagram.



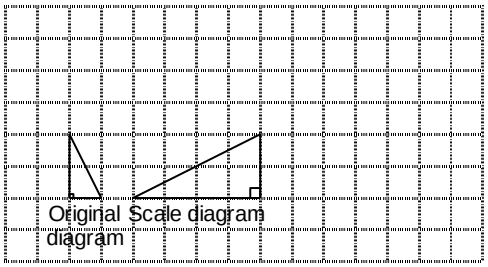
a. Rotational symmetry of order 2 about the centre; 4 lines of symmetry through the centre
b. Rotational symmetry of order 4 about the centre; 2 lines of symmetry through the centre
c. Rotational symmetry of order 2 about the centre; 2 lines of symmetry through the centre
d. Rotational symmetry of order 4 about the centre; 4 lines of symmetry through the centre

17. Which figure is **not** related to the shaded shape by rotational symmetry about point P?

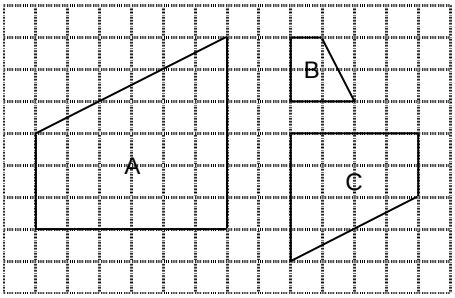


a. Figure ii b. Figure iv c. Figure ii d. Figure iii

18. Determine the scale factor for this scale drawing.



19. Determine the scale factor for each reduction using the diagram below.



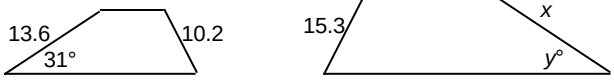
a) Quadrilateral B is a reduction of quadrilateral A.

b) Quadrilateral C is a reduction of quadrilateral A.

c) Quadrilateral B is a reduction of quadrilateral C.

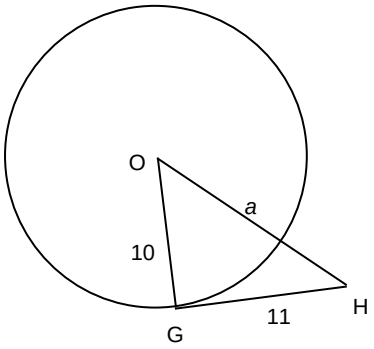
20. An airplane is 58 m long. A scale model of the plane is 40.6 cm long. Determine the scale factor used to create the model as a decimal.

21. These quadrilaterals are similar. Determine the values of x and $y°$.



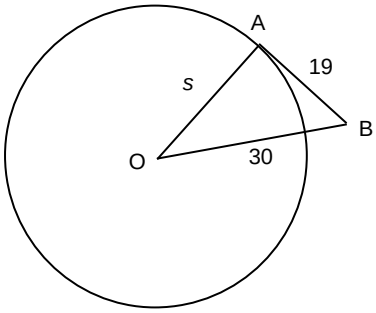
Unit 8 - Circle Geometry

1. O is the centre of this circle and point G is a point of tangency.
   Determine the value of *a*. If necessary, give your answer to the nearest tenth.



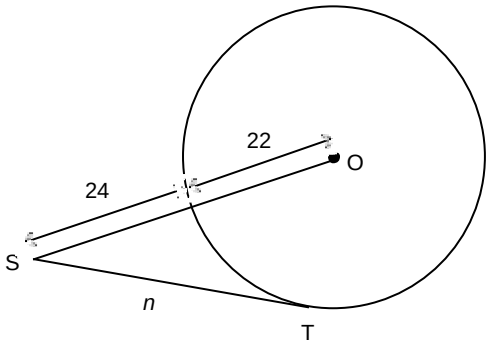
a. 11.3 b. 22.5 c. 4.6 d. 14.9

2. O is the centre of this circle and point A is a point of tangency.
   Determine the value of *b*. If necessary, give your answer to the nearest tenth.



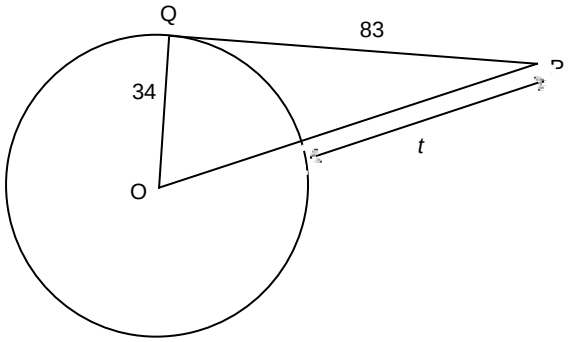
a. 5.5 b. 11 c. 23.2 d. 35.5

3. O is the centre of this circle and point T is a point of tangency.
   Determine the value of *n*. If necessary, give your answer to the nearest tenth.



a. 5.7 b. 51 c. 24 d. 40.4

4. O is the centre of this circle and point Q is a point of tangency.
   Determine the value of *t*. If necessary, give your answer to the nearest tenth.

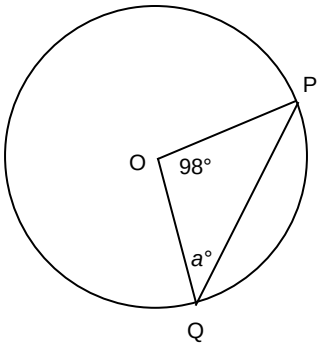


a. 61.3 b. 55.7 c. 55 d. 82.2

5. A circle has radius 7 cm. Which of the following measures could NOT be the length of a chord in the circle: 2 cm, 11 cm, 14 cm, or 17 cm?

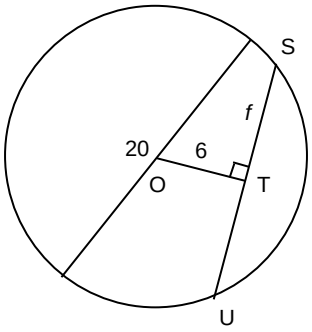
a. 17 cm
b. 11 cm
c. 2 cm
d. 14 cm

6. O is the centre of the circle.
Determine the value of $a°$.



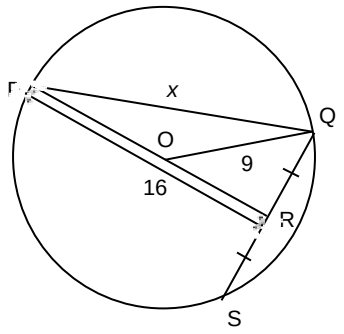
a. 49°
b. 20.5°
c. 41°
d. 69.5°

7. O is the centre of the circle.
Determine the value of f to the nearest tenth, if necessary.



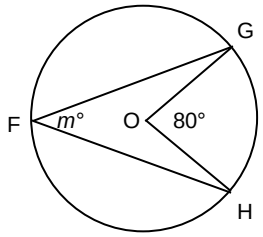
a. 4
b. 8
c. 64
d. 11.7

8. O is the centre of the circle. Determine the value of *x* to the nearest tenth, if necessary.



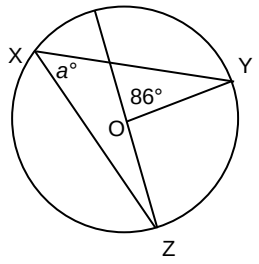
a. 5.7 b. 19.6 c. 288 d. 17

9. O is the centre of this circle. Determine the value of *m*°.



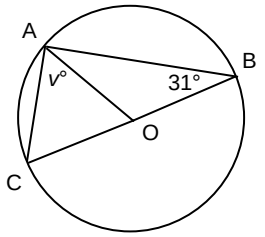
a. 90°
b. 80°
c. 180°
d. 40°

10. O is the centre of this circle. Determine the value of *a*°.



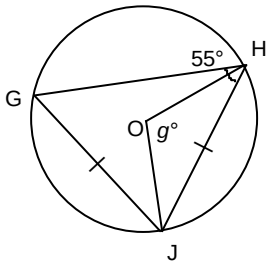
a. 47°
b. 86°
c. 94°
d. 90°

11. O is the centre of this circle. Determine the value of $v°$.



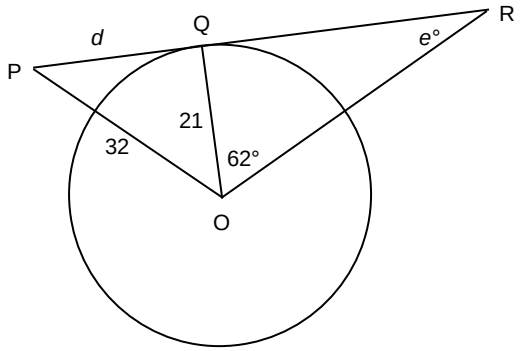
a. 118°
b. 59°
c. 90°
d. 31°

12. O is the centre of this circle. Determine the value of $g°$.

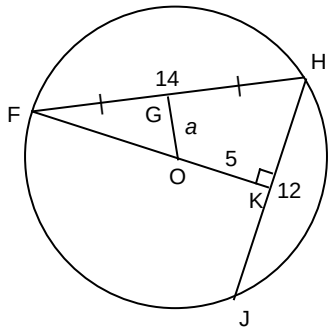


a. 70°
b. 55°
c. 110°
d. 90°

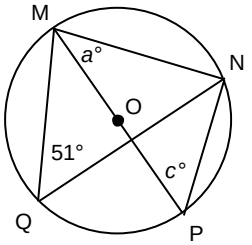
13. O is the centre of this circle and point Q is a point of tangency.
Determine the values of *d* and *e*°. If necessary, give your answers to the nearest tenth.



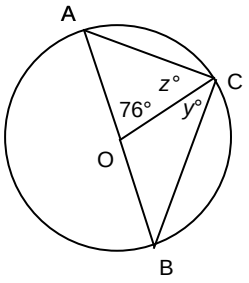
14. Point O is the centre of this circle. Determine the value of *a* to the nearest whole number.



15. Point O is the centre of the circle. Determine the values of $a°$ and $c°$.



16. Point O is the centre of the circle. Determine the values of $y°$ and $z°$.



Unit 9 - Probability & Statistics

1. Jon's coworkers pool their money so they can buy more lottery tickets and increase their chance of winning. Is their decision based on theoretical probability, experimental probability, or subjective judgment?

    a. A combination of theoretical and experimental probability
    b. Theoretical probability
    c. Experimental probability
    d. Subjective judgment

2. According to the weather forecast, there is a 90% chance of rain. Martin had planned to go running but decides to go to the gym instead so he doesn't get wet. Is his decision based on theoretical probability, experimental probability, or subjective judgment?

    a. Experimental probability
    b. Theoretical probability
    c. A combination of theoretical probability and subjective judgment
    d. Subjective judgment

3. A sports club is going to have a draw for a prize during its awards ceremony. Sasha did not enter the draw because she was not feeling lucky, and almost every club member had purchased a ticket. Was her decision based on theoretical probability, experimental probability, or subjective judgment?

    a. Subjective judgment
    b. Experimental probability
    c. Theoretical probability
    d. A combination of theoretical probability and subjective judgment

4. According to the weather forecast, there is a 90% chance of snow, with accumulations of up to 10 cm. Andrew drives out to see his friends because he thinks the weather will not be as bad as it is forecasted to be. Is his decision based on theoretical probability, experimental probability, or subjective judgment?

    a. Subjective judgment
    b. A combination of experimental probability and subjective judgment
    c. Theoretical probability
    d. Experimental probability

5. On a hot sunny day in June, teenagers were surveyed to find out how they feel about the city building a new outdoor ice skating rink. In this survey, which of the following might be a problem?

   i) Cultural sensitivity
   ii) Timing
   iii) Use of Language
   iv) Privacy

   a. i b. ii c. iii d. iv

6. In late November Anita surveyed every student in her class to find out their favourite Christmas carols. Which of the following might be a problem?

   i) Timing
   ii) Use of Language
   iii) Cultural sensitivity
   iv) Cost

   a. i b. iii c. iv d. ii

7. Omar asked his classmates the following question. “Don’t you think apartment buildings should allow residents to have cats?” Which of the following might be a problem with his survey?

   i) Timing
   ii) Bias
   iii) Privacy
   iv) Cost

   a. i b. iv c. ii d. iii

8. Marissa asked everyone in her class what chocolate bar they liked best. Before her next test, she gave her teacher the chocolate bar he’d said he liked best. What was a problem with Marissa’s survey?

   i) Use of Language
   ii) Cost
   iii) Ethics
   iv) Timing

   a. iii b. ii c. iv d. i

9. A cosmetics company wants to determine which eye shadow colours are preferred by the readers of a certain fashion magazine. What is the population they are interested in surveying?

i) People who purchase the magazine
ii) People who wear eye shadow
iii) People who read the magazine
iv) Fashion experts featured in the magazine

a. i b. ii c. iv d. iii

10. A newspaper company wants to make sure that the pages of its newspaper appear in the correct order. Which population is it interested in testing?

i) All newspapers printed
ii) Newspapers delivered to residences
iii) Newspapers sold at newspaper stands
iv) Newspapers delivered to businesses

a. ii b. iv c. iii d. i

11. A baker wants to check the quality of the muffins he bakes each day. Which of the following data collection methods would provide the most accurate information?

i) Test one muffin from each batch
ii) Test all the muffins in the first batch
iii) Test all the muffins in a random batch
iv) Test all the muffins in the last batch

a. i b. iv c. ii d. iii

12. For a science project, groups of grade 9 students each analyzed a sample of water from a local stream.

Group P collected samples every Monday morning before school.
Group Q collected samples at different times every Tuesday.
Group R collected samples before school on different days.
Group S collected samples at different times on different days

Which group will produce the most reliable information?

a. Group Q b. Group R c. Group P d. Group S

13. Adriane noted that there were 64 males and 16 females in the cafeteria when she ate lunch. She concluded that 80% of the people who use the cafeteria are male. What assumptions did Adriane make?

14. Describe how this question reveals a bias of the questioner. “Do you think driving while talking on a cellphone should be banned because it causes more accidents?”

15. To assess the need for pre-school day care facilities in your neighbourhood, what population would you survey?

16. A food company wants to know what people aged 15 to 25 eat for breakfast. They interview a random sample of high school, college, and university students. What is a potential problem with this sampling method?

17. A local radio station invites its listeners to call in and say whether they think schools should provide perks, such as free MP3 players, for students with perfect attendance. Will the selected sample represent the population?

18. A vice-principal would like to organize a field trip for all grade 9 students. To gauge interest in the trip, he plans to have 30 randomly selected grade 9 students fill out a questionnaire. Will the selected sample represent the population?