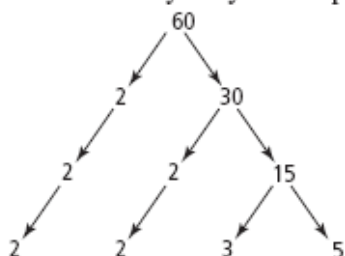


MathLinks 8 Practice and Homework Book

Chapter 3 Answers

3 Get Ready

1. a) Answers may vary. Example:



- b) 1 and 60, 2 and 30, 3 and 20, 4 and 15, 5 and 12, 6 and 10
2. 1 and 12, 2 and 6, 3 and 4
3. a) 56 cm b) 33 m²
4. a) 5, 6, 7, 8
b) 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
5. a) 6.5 b) 30.5
6. a) 7 b) 16
7. a) 6 b) 3

3.1 Squares and Square Roots

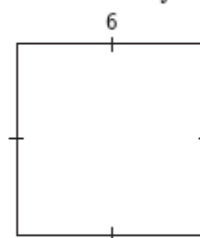
1. d) Prime number
2. b) Square number
3. e) Square root
4. c) Perfect square
5. a) Prime factorization

6. a) $2 \times 2 \times 3 \times 3$

b) Yes. Answers may vary. Example: There is one pair of 2s and one pair of 3s.

$$2 \times 3 = 6, 6 \times 6 = 36$$

c) Answers may vary. Example:

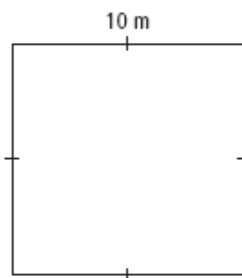


7. a) $2 \times 2 \times 5 \times 5$

b) Yes. Answers may vary. Example: There is one pair of 2s and one pair of 5s.

$$2 \times 5 = 10, 10 \times 10 = 100$$

c) Answers may vary. Example:



8. a) $2 \times 2 \times 41$

b) $2 \times 2 \times 7 \times 7$, perfect square

c) $3 \times 3 \times 5 \times 5$, perfect square

d) $13 \times 5 \times 5$

9. Strategies may vary. Example: $1296 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$. 1296 is a perfect square because it is the product of 36×36 .

10. Yes. Answers may vary. Example: The prime factors of 9 and 16 repeat themselves. 9 is the product of 3×3 and 16 is the product of $2 \times 2 \times 2 \times 2$. The prime factors repeat themselves an even number of times. 10 is not a perfect square because its prime factors do not repeat themselves.

3.2 Exploring the Pythagorean Relationship

- Answers may vary. Two are possible:
 - Area of R + Area of S = Area of T
 - $d^2 + e^2 = f^2$
 - Answers may vary. Example: The sum of the areas of the squares attached to the legs of a right triangle is equal to the area of the square attached to the hypotenuse.
- $J = 36 \text{ m}^2$, $K = 64 \text{ m}^2$, $L = 100 \text{ m}^2$
 - Answers may vary and should include two of the following:
 - $36 \text{ m}^2 + 64 \text{ m}^2 = 100 \text{ m}^2$
 - $6^2 + 8^2 = 10^2$
 - Area of J + Area of K = Area of L
- 64 cm^2 , 8 cm ; 225 cm^2 , 15 cm ; 289 cm^2 , 17 cm
 - Answers may vary and should include one of the following:
 - $64 \text{ cm}^2 + 225 \text{ cm}^2 = 289 \text{ cm}^2$
 - $8^2 + 15^2 = 17^2$
- 225 cm^2 , 400 cm^2 , 625 cm^2
 - Answers may vary and should include one of the following:
 - $225 \text{ m}^2 + 400 \text{ m}^2 = 625 \text{ m}^2$
 - $15^2 + 20^2 = 25^2$
- Yes. Answers may vary. Example: The area of the square on the hypotenuse equals the total of the areas of the squares on each of the two legs.
- 61 cm^2 51 cm^2
 - 130 cm^2 241 mm^2
- Yes. Answers may vary. Example: The areas of the squares on the two smaller sides are 9 m^2 and 16 m^2 . These add up to 25 m^2 , which is the area of the square on the longest side.

3.3 Estimating Square Roots

- Answers may vary for estimates. Example:
 - 6.3 14
- whole, exact
 - decimal, approximation

- 4, 9 16, 25 64, 81 81, 100
- 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
- Answers may vary for estimates. Example:
 - 4.1 9.2
- Answers may vary for estimates.
 - 25, 36, 5.2 49, 64, 7.4
 - 100, 121, 10.2 121, 144, 11.8
- Answers may vary for estimates. Example: 6.7 cm
- 15
- Answers may vary for estimates. Example: 7.7 m
 - Yes. Answers may vary. Example: If each side is about 7.7 m, multiply that times 4 to get 30.8 m, which is less than 32 m.
- Answers may vary. Example: The maximum size of the rug should be approximately 14.4 m^2 .

3.4 Using the Pythagorean Relationship

- Pythagorean, length, hypotenuse, legs
- 10 m 36 cm
- 41 cm 37 m
- 12 cm 12 cm
- 3.3 cm 9.7 cm
- 10.2 cm
- 4.5 m 17 m
- No. Answers may vary. Example: The areas of the squares on each leg add to 13 m^2 . The area of the square on the long side is 25 m^2 . If the ramp had a right triangle, these two values would be equal.

3.5 Applying the Pythagorean Relationship

- Answers are in italics.

$$d^2 = 12^2 + 5^2$$

$$d^2 = 144 + 25$$

$$d^2 = 169$$

$$d = \sqrt{169}$$

$$d = 13$$
 The hypotenuse is 13 km long.

b) Answers are in italics.

$$15^2 + 20^2 = 25^2$$

$$\text{Left side: } 15^2 + 20^2 = 225 + 400 \\ = 625$$

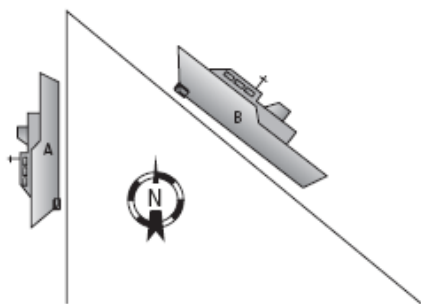
$$\text{Right side: } 25^2 = 625$$

Yes, Yes

2. 12.7 cm
3. 100 m
4. 5.9 m
5. 6.9 cm
6. a) 15 cm b) 120 cm²
7. No. Answers may vary. Example: The corners do not meet at right angles because $17^2 + 26^2 \neq 31^2$.
8. 250 km

3 Link It Together

1. Answers are in italics.
 - a) Factors: 1, 2, 4, 8, 16; square root: 4
 - b) Factors: 1, 3, 9, 27, 81; square root: 9
 - c) Factors: 1, 2, 3, 4, 6, 8, 12, 18, 24, 36, 48, 72, 144; square root: 12
 - d) Factors: 1, 5, 15, 45, 225; square root: 15
 - e) Factors: 1, 5, 25, 125, 625; square root: 25
2. a) Drawings may vary. Example:



- b) Rescue boat A: $\frac{36}{60} = \frac{3}{5}, \frac{3}{5}h \times 15 \text{ km/h} = 9 \text{ km}.$
 Rescue boat B: $\frac{45}{60} = \frac{3}{4}, \frac{3}{4} \times 20 \text{ km/h} = 15 \text{ km}.$
- c) $x^2 = 15^2 - 9^2, x^2 = 225 - 81, x^2 = 144,$
 $x = \sqrt{144}, x = 12.$ The rescue boats were 12 km apart when they started.

3 Vocabulary Link

Across

2. perfect square
4. Pythagorean relationship

Down

1. square root
2. prime factorization
3. hypotenuse
5. legs