
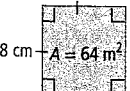


11. **a)** 50 steps/min **b)** \$0.90/L **c)** 624 km/h **d)** 50 kg/year
 12. **a)** Answers may vary. Example: 4.98 : 13.95
b) Answers may vary. Example: \$4.98/3 kg **c)** The unit price in Winnipeg is \$1.66/kg. The unit price in Little Grand Rapids is \$4.65/kg. The difference in price/kg is \$2.99/kg.
 13. **a)** fridge: 5.0¢/h; computer and monitor: 3.6¢/h; television: 1.9¢/h; treadmill: 26.6¢/h **b)** The television has the lowest rate of electricity consumption.
 14. **a)** Shelley travelled farther. **b)** The difference is 2.5 km.
 15. **a)** 16 kg **b)** \$10.50 **c)** 18 min
 16. **a)** \$7.84 **b)** 5.3 cm
 17. **a)** 8.40 cm **b)** 10.7 g **c)** 33 g
 18. **a)** 5 m **b)** 51 cm

Chapter 3

3.1 Squares and Square Roots, pages 85–87

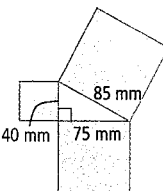
5. **a)** $4 = 2 \times 2$ **b)** Yes, the prime factor, 2, appears an even number of times. **c)** 

6. **a)** $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$ **b)** Yes, 64 is a perfect square. The prime factor, 2, appears an even number of times. **c)** 

7. **a)** $42 = 2 \times 3 \times 7$; 42 is not a perfect square.
b) $169 = 13 \times 13$; 169 is a perfect square.
c) $256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$; 256 is a perfect square.
 8. **a)** $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3$; 144 is a perfect square.
b) $60 = 2 \times 2 \times 3 \times 5$; 60 is not a perfect square.
c) $40 = 2 \times 2 \times 2 \times 5$; 40 is not a perfect square.
 9. **a)** 100 square units **b)** 256 square units
 10. **a)** 400 square units **b)** 289 square units
 11. **a)** 81 **b)** 121
 12. **a)** 9 **b)** 324
 13. 7 mm
 14. 30 cm
 15. **a)** 7 **b)** 8 **c)** 25
 16. **a)** 3 **b)** 5 **c)** 40
 17. $54 = 2 \times 3 \times 3 \times 3$; No, 54 is not a perfect square because it has an odd number of factors of 2 and 3.
 18. 196 m²
 19. 1360 m
 20. **a)** 36 m² **b)** 6 m
 21. **a)** 56 m² **b)** Answers may vary. Example: 7 m by 8 m is one set of dimensions for the patio. **c)** No, it is not possible to make a patio with the same area that is a square since 56 is not a perfect square.
 22. **a)** 630 m by 630 m **b)** 395 641 m² **c)** 622 m by 622 m or 623 m by 623 m or 624 m by 624 m or 625 m by 625 m or 626 m by 626 m or 627 m by 627 m.
 23. 20 m

24. **a)** 10, 15, 21 **b)** The sum of any two consecutive triangular numbers is a perfect square.
 25. **a)** 12 cm **b)** 1296 cm² **c)** 9 times **d)** 3 times **e)** To find the number of times the side length is enlarged, calculate the square root of the times that the area has been enlarged.
 26. **a)** perfect squares: 100 and 10 000 **b)** $\sqrt{100} = 10$ and $\sqrt{10\,000} = 100$ **c)** Answers may vary. Example: The number 1000 is not a perfect square. The prime factorization of 1000 is $2 \times 2 \times 2 \times 5 \times 5 \times 5$. There is an odd number of factors of 2 and 5.
d) Any power of 10 with an even number of trailing zeros will be a perfect square.
e) No, 1 000 000 000 is not a perfect square because it has an odd number of trailing zeros.
 27. **a)** $\sqrt{6400} = 80$, $\sqrt{640\,000} = 800$, $\sqrt{64\,000\,000} = 8000$ **b)** Take the square root of 64 and then “add” half the number of trailing zeros from the original number.
c) There is an odd number of trailing zeros.
d) 800 000; Calculate the square root of 64, which is 8. Then count the number of trailing zeros, which is 10. Take half of that number of trailing zeros, which is 5, and attach that many zeros to 8.

3.2 Exploring the Pythagorean Relationship, pages 92–94

4. 900 mm²; 1600 mm²; 2500 mm²
 5. **a)**  **b)** 1600 mm²; 5625 mm²; 7225 mm²
c) $1600 + 5625 = 7225$

6. **a)** $25 + 144 = 169$ **b)** 5 cm; 12 cm; 13 cm
c) The sum of the areas of the two smaller squares is equal to the area of the largest square: $5^2 + 12^2 = 13^2$.
 7. **a)** 81 cm²; 144 cm²; 225 cm² **b)** $81 + 144 = 225$ **c)** The sum of the areas of the two smaller squares is equal to the area of the largest square: $9^2 + 12^2 = 15^2$.
 8. No, the triangle is not a right triangle. The sum of the areas of the smaller squares is not equal to the area of the largest square: $20^2 + 40^2 \neq 50^2$.
 9. **a)** 4 cm²; 9 cm²; 16 cm² **b)** No, the triangle is not a right triangle. The sum of the areas of the smaller squares is not equal to the area of the largest square: $2^2 + 3^2 \neq 4^2$.
 10. Yes, the triangle is a right triangle. The sum of the areas of the two smaller squares is equal to the area of the largest square: $120^2 + 160^2 = 200^2$.
 11. Answers may vary. Example: No, the triangle is not a right triangle. The sum of areas of the squares of the two shorter sides does not equal the area of the square of the longest side, the hypotenuse. $5^2 = 25$, $6^2 = 36$, and $8^2 = 64$; $25 + 36 \neq 64$.
 12. **a)** 52 cm² **b)** 676 mm² **c)** 65 cm² **d)** 24 cm²
 13. No, the garden is not a right triangle. The sum of the areas of the smaller squares is not equal to the area of the largest square: $4800 + 4800 \neq 9800$.