

# Chapter 1 Review

## Learning Goals

**Inquire and Explore:** How is squaring a number related to taking the square root of a number?  
 How are the side lengths of a right triangle related to square and square roots of numbers?  
 What pattern can you generalize to make a rule about the side lengths of right triangles?

After this section, I can

1.1	<ul style="list-style-type: none"> <li>use multiple strategies to identify square numbers</li> <li>determine the square root of a number using mental math, visualization, and number sense</li> <li>estimate the square root of a number</li> </ul>
1.2	<ul style="list-style-type: none"> <li>represent the Pythagorean relationship pictorially and symbolically</li> <li>demonstrate understanding through solving problems involving the Pythagorean relationship</li> </ul>
1.3	<ul style="list-style-type: none"> <li>connect the Pythagorean relationship to real-world contexts</li> <li>solve problems by determining unknown measures of sides of right triangles or distances</li> </ul>

### 1.1 Squares and Square Roots, pages 6–13

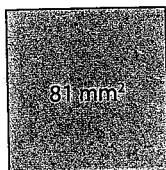
1. Which number is a perfect square?

- A 10                                      B 20  
 C 100                                      D 200

2. The value of  $\sqrt{51}$  is closest to which whole number?

- A 7    B 8  
 C 49                                        D 64

3. What is the side length of the square in the diagram?

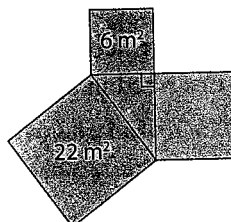


4. Determine the prime factorization of 196. Then explain how you can use the prime factorization to find the square root of 196.

5. Using estimation, place the value of the sum  $\sqrt{10} + \sqrt{17}$  on a number line. Explain your thinking.

### 1.2 Exploring the Pythagorean Relationship, pages 14–21

6. A right triangle has squares on each of its sides. What is the area of the blue square?



- A 4 m<sup>2</sup>                                      B 14 m<sup>2</sup>  
 C 16 m<sup>2</sup>                                    D 28 m<sup>2</sup>

7. The areas of the squares on two sides of a right triangle are 26 cm<sup>2</sup> and 40 cm<sup>2</sup>. What are the possible areas for the square on the third side? Draw diagrams to support your answers.

8. The table shows the side lengths of four triangles. Which triangles are right angled?

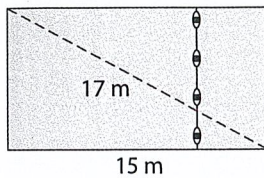
Triangle	Side x (cm)	Side y (cm)	Side z (cm)
A	9	12	15
B	5	6	7
C	12	35	37
D	30 000	40 000	50 000

**1.3 Applying the Pythagorean Relationship,**  
pages 22–30

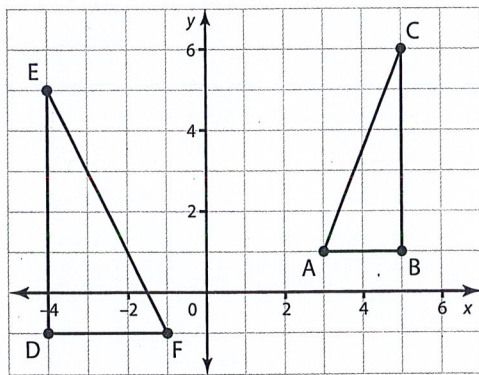
**Connect the Concepts**

9. For a right triangle with sides  $m$ ,  $p$ , and  $v$ , the Pythagorean relationship is  $v^2 = m^2 + p^2$ . Which variable represents the length of the hypotenuse?

10. The rectangular pool at Wild Water World has a length that measures 15 m and a diagonal that measures 17 m. A float line divides the shallow end and deep end. What is the length of the float line?

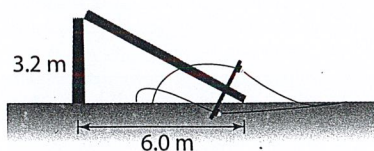


11. The coordinate grid was drawn on centimetre grid paper. Answer the following questions to the nearest tenth of a centimetre, where appropriate.

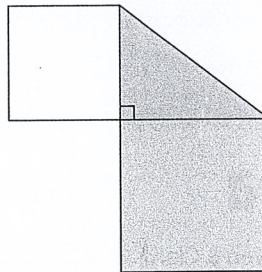


- What is the length of the hypotenuse in  $\triangle ABC$ ? in  $\triangle DEF$ ?
- What is the perimeter of  $\triangle DEF$ ?

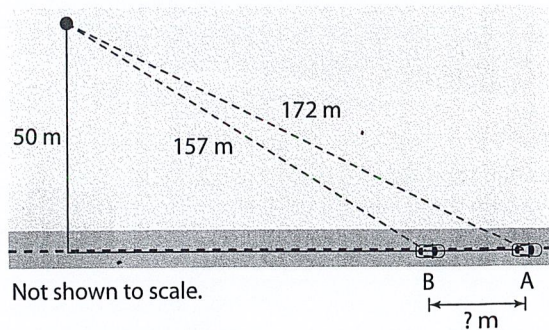
12. Lightning strikes a wooden telephone pole, breaking it 3.2 m above the ground. If the top of the pole touches the ground 6.0 m from its base, what was the length of the pole before it broke?



13. The white square on the left side of the diagram has an area of  $225 \text{ mm}^2$ . The hypotenuse of the right triangle is 25 mm long. What is the area of the yellow square?



14. A police officer uses a laser speed gun to ticket drivers who are going too fast. The radar gun quickly takes two measurements of the distance between it and the approaching car to determine the car's speed. The officer is 50 m from the side of the road. The distance between the officer and the car at A is 172 m. The distance at B is 157 m.



- How far has the car travelled between the two measurements?
- The radar gun uses the difference between the two distance measurements, 157 m and 172 m, to determine if the car is speeding. How does this number compare to part a)?
- Is the speed calculated by the radar gun an underestimate or an overestimate of the car's actual speed? Explain your thinking.