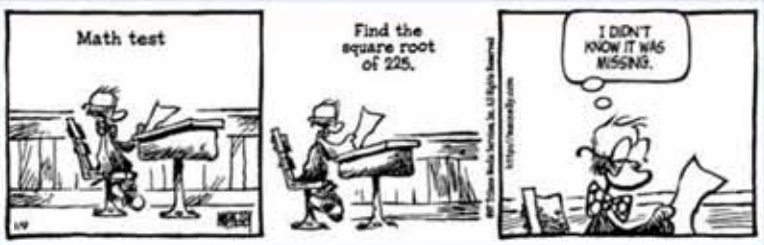
Square Roots and Perfect Squares - 6 Jan 2010

Communicate the Ideas

1. Explain how to square the number 7.

2. How would you use prime factorization to determine the square root of 225? Compare your answer with a classmate's.



3. The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36. Use words and/or diagrams to explain how you know which factor is the square root of 36.

4. Explain how squaring a number is the reverse of finding the square root of a number. Include an example with your explanation.

Check Your Understanding

Practise

5. a) Determine the prime factorization of 4.
   b) Is 4 a perfect square? Explain.
   c) Draw the square and label its side length.

6. A rectangle has an area of 64 m^2.
   a) Determine the prime factorization of 64.
   b) Is 64 a perfect square? Explain.
   c) Draw a square with that area and label its side length.

7. Write the prime factorization of each number. Identify the perfect squares.
   a) 42 b) 169 c) 256

8. Determine the prime factorization of each number. Which numbers are perfect squares?
   a) 144 b) 60 c) 40

9. What is the area of a square with each side length?
   a) 10 b) 16

10. Determine the area of a square with each side length.
    a) 20 b) 17

11. What is the square of each number?
    a) 9 b) 11

12. Determine the square of each number.
    a) 3 b) 18

13. What is the side length of the square shown?

14. Determine the side length of a square with an area of 900 cm^2.

15. Evaluate.

a) $\sqrt{49}$ **b)** $\sqrt{64}$ **c)** $\sqrt{625}$

16. Determine the value.

a) $\sqrt{9}$ **b)** $\sqrt{25}$ **c)** $\sqrt{1600}$

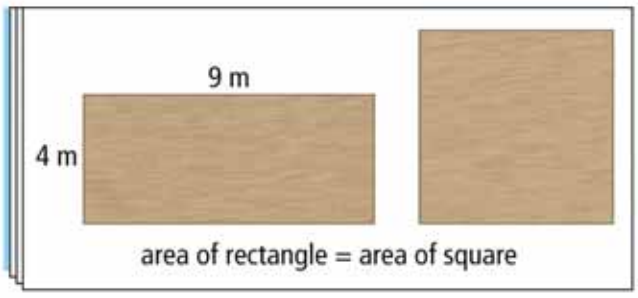
Apply

17. A fridge magnet has an area of 54 mm^2. Is 54 a perfect square? Use prime factorization to find the answer.

18. A floor mat for gymnastics is a square with a side length of 14 m. What is the area of the floor mat in square metres?

19. The gym teacher told the students to run twice around the perimeter of the school field. The area of the square field is 28 900 m^2. What distance did the students run?

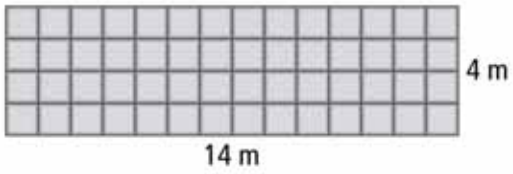
20. Adam's uncle has instructions for building a shed. One page of the instructions, shown below, is not very clear.



a) What is the area of the rectangle?

b) What is the side length of the square?

21. Kate is going to put a patio in her backyard. The patio stones she is using each have an area of 1 m^2. She has created the rectangular design shown.



a) What is the area of the patio?

b) What are the dimensions of another rectangular patio she could build with the same area?

c) Kate decides to make a patio with the same area but she wants it to be a square with whole number side lengths. Is this possible? Explain your reasoning.

22. The world's largest city square is Tiananmen Square in Beijing, China. It has an area of 396 900 m^2.

a) What are the dimensions of the square?

b) If the square had dimensions of 629 m by 629 m, what would be the area?

c) If the square had an area less than 394 000 m^2 and greater than 386 000 m^2, what are all of the possible whole number dimensions that it could have?

23. A helicopter landing pad has a square shape. The area is 400 m^2. Use prime factorization to find the side length of the pad.