Lesson 3 Practice Problems

1. Consider the equation $x^2 = 9$.

    a. Show that 3, -3, $\sqrt{9}$, and $-\sqrt{9}$ are each a solution to the equation.

    b. Show that 9 and $\sqrt{3}$ are each *not* a solution to the equation.

2. Solve $(x - 1)^2 = 16$. Explain or show your reasoning.

3. Here is one way to solve the equation $\frac{5}{9}y^2 = 5$. Explain what is done in each step.

$\frac{5}{9}y^2 = 5$	Original equation
$5y^2 = 45$	Step 1
$y^2 = 9$	Step 2
$y = 3$ or $y = \text{-}3$	Step 3

4. Diego and Jada are working together to solve the quadratic equation $(x - 2)^2 = 100$.

    Diego solves the equation by dividing each side of the equation by 2 and then adding 2 to each side. He writes:

    $$(x - 2) = 50$$
    $$x = 52$$

    Jada asks Diego why he divides each side by 2 and he says, "I want to find a number that equals 100 when multiplied by itself. That number is half of 100."

    a. What mistake is Diego making?

    b. If you were Jada, what could you say to Diego to help him realize his mistake?

5. As part of a publicity stunt (an event designed to draw attention), a TV host drops a watermelon from the top of a tall building. The height of the watermelon t seconds after it is dropped is given by the function $h(t) = 850 - 16t^2$, where h is in feet.

   a. Find $h(4)$. Explain what this value means in this situation.

   b. Find $h(0)$. What does this value tell us about the situation?

   c. Is the watermelon still in the air 8 seconds after it is dropped? Explain how you know.

   (From Unit 7, Lesson 1.)

6. A zoo offers unlimited drink refills to visitors who purchase its souvenir cup. The cup and the first fill cost $10, and refills after that are $2 each. The expression $10 + 2r$ represents the total cost of the cup and r refills.

   a. A family visited the zoo several times over a summer. That summer, they paid $30 for one cup and multiple refills. How many refills did they buy?

   b. A visitor has $18 to spend on drinks at the zoo today and buys a souvenir cup. How many refills can they afford during the visit?

   c. Another visitor spent $10 on this deal. Did they buy any refills? Explain how you know.

   (From Unit 7, Lesson 2.)

7. Here are a few pairs of positive numbers whose sum is 15. The pair of numbers that have a sum of 15 and will produce the largest possible product is *not* shown.

Find this pair of numbers.

first number	second number	product
1	14	14
3	12	36
5	10	50
7	8	56

(From Unit 6, Lesson 1.)

8. Clare is 5 years older than her sister.

a. Write an equation that defines her sister's age, s, as a function of Clare's age, c.

b. Write an equation that defines Clare's age, c, as a function of her sister's age, s.

c. Graph each function. Be sure to label the axes.
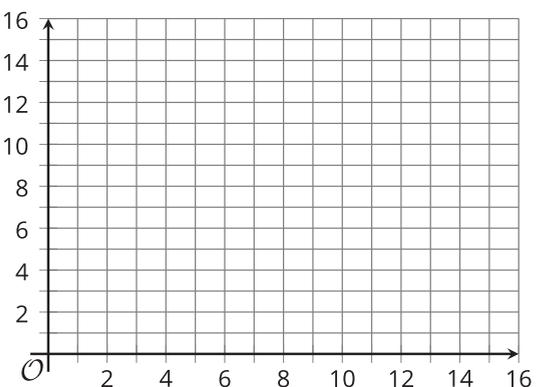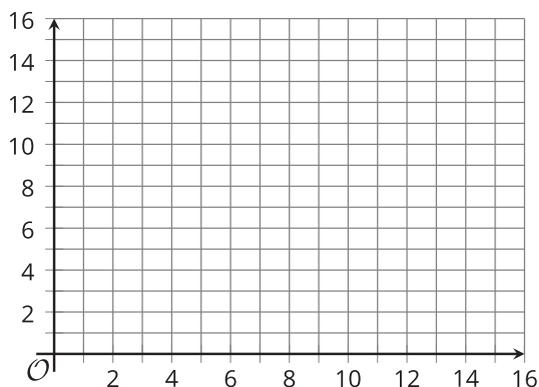
d. Describe how the two graphs compare.

(From Unit 4, Lesson 15.)

9. The graph shows the weight of snow as it melts. The weight decreases exponentially.

a. By what factor does the weight of the snow decrease each hour? Explain how you know.
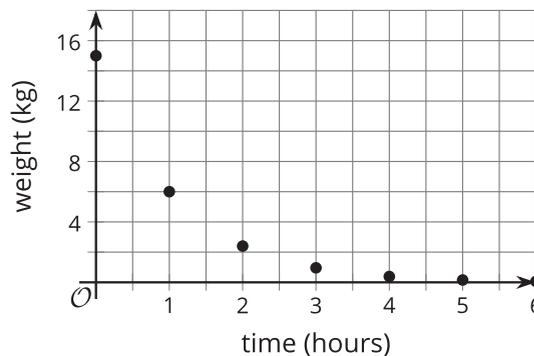
b. Does the graph predict that the weight of the snow will reach 0? Explain your reasoning.

c. Will the weight of the actual snow, represented by the graph, reach 0? Explain how you know.

(From Unit 5, Lesson 5.)