Lesson 7 Practice Problems

1. Based on past musical productions, a theater predicts selling $400 - 8p$ tickets when each ticket is sold at p dollars.

   a. Complete the table to find out how many tickets the theater expects to sell and what revenues it expects to receive at the given ticket prices.

ticket price (dollars)	number of tickets sold	revenue (dollars)
5		
10		
15		
20		
30		
45		
50		
p		

   b. For which ticket prices will the theater earn no revenue? Explain how you know.

   c. At what ticket prices should the theater sell the tickets if it must earn at least $3,200 in revenue to break even (to not lose money) on the musical production? Explain how you know.

2. A company sells running shoes. If the price of a pair of shoes in dollars is p, the company estimates that it will sell $50{,}000 - 400p$ pairs of shoes.

   Write an expression that represents the revenue in dollars from selling running shoes if a pair of shoes is priced at p dollars.

3. The function f represents the revenue in dollars the school can expect to receive if it sells $220 - 12x$ coffee mugs for x dollars each.

Here is the graph of f.

Select **all** the statements that describe this situation.
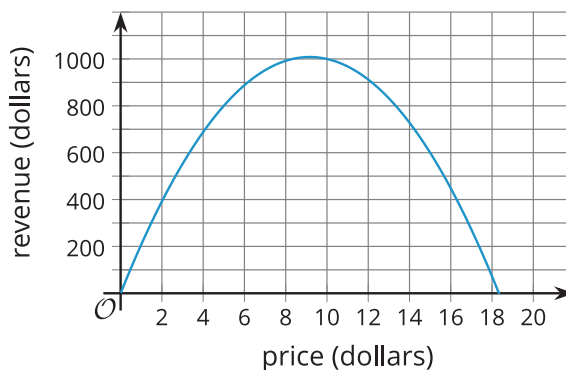
A. At $2 per coffee mug, the revenue will be $196.

B. The school expects to sell 160 mugs if the price is $5 each.

C. The school will lose money if it sells the mugs for more than $10 each.

D. The school will earn about $1,000 if it sells the mugs for $10 each.

E. The revenue will be more than $700 if the price is between $4 and $14.

F. The expected revenue will increase if the price per mug is greater than $10.

4.   a. Write an equation to represent the relationship between the step number, n, and the number of small squares, y.

   Briefly describe how each part of the equation relates to the pattern.

Step 1   Step 2   Step 3
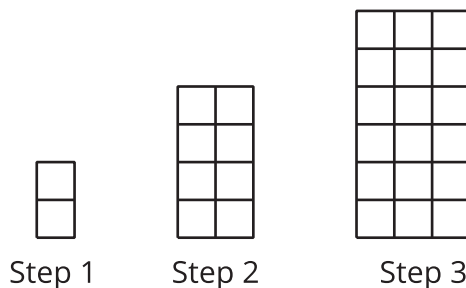
   b. Is the relationship between the step number and number of small squares quadratic? Explain how you know.

(From Unit 6, Lesson 3.)

5. *Technology required.* A small marshmallow is launched straight up in the air with a slingshot. The function h, given by the equation $h(t) = 5 + 20t - 5t^2$, describes the height of the marshmallow in meters as a function of time, t, in seconds since it was launched.

   a. Use graphing technology to graph the function h.

   b. About when does the marshmallow reach its maximum height?

   c. About how long does it take before the marshmallow hits the ground?

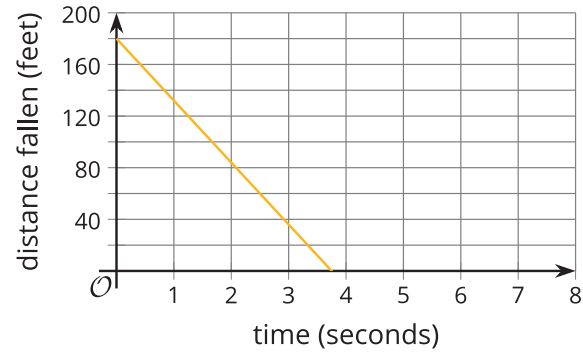   d. What domain makes sense for the function h in this situation?

(From Unit 6, Lesson 5.)

6. A rock is dropped from a bridge over a river. Which graph could represent the distance fallen, in feet, as a function of time in seconds?
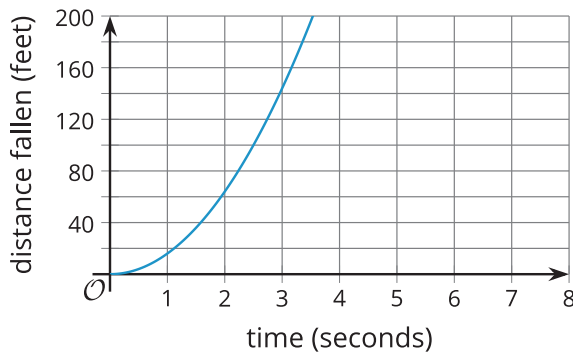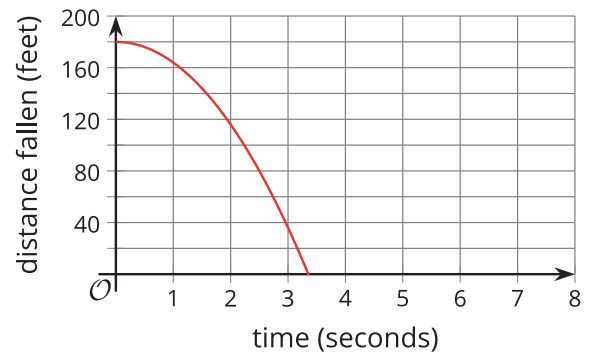
Graph A
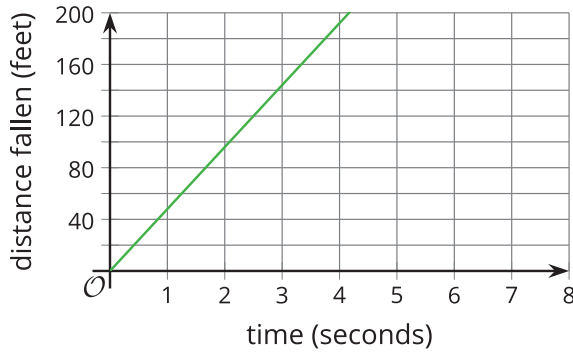
Graph B

Graph C

Graph D

A. Graph A

B. Graph B

C. Graph C

D. Graph D

(From Unit 6, Lesson 5.)

7. A bacteria population, p, is modeled by the equation $p = 100{,}000 \cdot 2^d$, where d is the number of days since the population was first measured.

Select **all** statements that are true in this situation.

A. $100{,}000 \cdot 2^{-2}$ represents the bacteria population 2 days before it was first measured.

B. The bacteria population 3 days before it was first measured was 800,000.

C. The population was more than 1,000 one week before it was first measured.

D. The population was more than 1,000,000 one week after it was first measured.

E. The bacteria population 4 days before it was first measured was 6,250.

(From Unit 5, Lesson 7.)