

Additional Practice**Investigation 4****Frogs, Fleas, and Painted Cubes**

1. A ship conducting oceanographic research drops anchor offshore Honiara, the capitol of the Solomon Islands in the South Pacific. When the anchor is tossed into the water, the depth in feet D it has descended after t seconds is given by the equation $D = -4t^2 + 12t$.
 - a. If it takes the anchor 10 seconds to reach the bottom, how deep is the water where the ship has dropped anchor?
 - b. If the ship moves to another location and the anchor takes 8.5 seconds to reach the bottom, how deep is the water in that spot?
 - c. If the ship anchors in the harbor of Honiara, where the water is 72 feet deep (that is, $D = -72$), how long will it take for the anchor to reach the bottom when it is dropped?

2. Metropolitan Container produces storage containers from recycled plastic. The total cost in dollars C of manufacturing n containers is given by the equation $C = 2n^2 + 9n + 100$.
 - a. What is the total cost of manufacturing 4 containers?
 - b. What is the total cost of manufacturing 10 containers?
 - c. The *average cost* of manufacturing each container is $\frac{C}{n}$, the total cost of manufacturing the containers divided by the number of containers.
 - i. Based on your answer to part (a), what is the average cost of manufacturing 4 containers?
 - ii. Based on your answer to part (b), what is the average cost of manufacturing 10 containers?

Additional Practice *(continued)*

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iii. Compare your answers to parts (i) and (ii). What can you say about manufacturing 4 containers versus 10 containers?

d. The city of Metropolis has placed an order for a certain number of containers. If the cost of producing these containers is \$3,660, how many containers did the city order? Explain your reasoning.

3. a. Complete this table for the equation $y = 5x^2$.

x	0	1	2	3	4
y					

b. What are the first differences in your table for the y values as x increases by 1?

c. What are the second differences in your table for the y values as x increases by 1?

d. Describe any patterns in the values you found in part (c) for the second differences.

4. a. Complete this table for the equation $y = 8x^2$.

x	0	1	2	3	4
y					

b. What are the first differences in your table for the y values as x increases by 1?

c. What are the second differences in your table for the y values as x increases by 1?

d. Describe any patterns in the values you found in part (c) for the second differences.