Lesson 20 Practice Problems

1. Whenever the input of a function f increases by 1, the output increases by 5. Which of these equations could define f?

   A. $f(x) = 3x + 5$

   B. $f(x) = 5x + 3$

   C. $f(x) = 5^x$

   D. $f(x) = x^5$

2. The function f is defined by $f(x) = 2^x$. Which of the following statements is true about the values of f? Select **all** that apply.

   A. When the input x increases by 1, the value of f increases by 2.

   B. When the input x increases by 1, the value of f increases by a factor of 2.

   C. When the input x increases by 3, the value of f increases by 8.

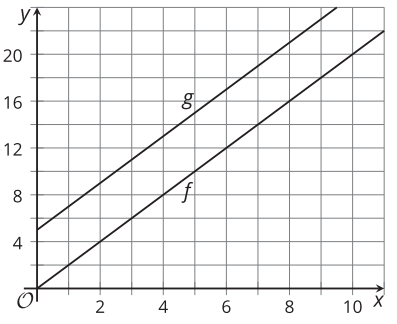
   D. When the input x increases by 3, the value of f increases by a factor of 8.

   E. When the input x increases by 4, the value of f increases by a factor of 4.

3. The two lines on the coordinate plane are graphs of functions f and g.

   a. Use the graph to explain why the value of f increases by 2 each time the input x increases by 1.

   b. Use the graph to explain why the value of g increases by 2 each time the input x increases by 1.



4. The function h is given by $h(x) = 5^x$.

   a. Find the quotient $\frac{h(x+2)}{h(x)}$.

   b. What does this tell you about how the value of h changes when the input is increased by 2?

   c. Find the quotient $\frac{h(x+3)}{h(x)}$.

   d. What does this tell you about how the value of h changes when the input is increased by 3?

5. For each of the functions f, g, h, p, and q, the domain is $0 \leq x \leq 100$. For which functions is the average rate of change a good measure of how the function changes for this domain? Select **all** that apply.

   A. $f(x) = x + 2$

   B. $g(x) = 2^x$

   C. $h(x) = 111x - 23$

   D. $p(x) = 50{,}000 \cdot 3^x$

   E. $q(x) = 87.5$

   (From Unit 5, Lesson 10.)

6. The average price of a gallon of regular gasoline in 2016 was $2.14. In 2017, the average price was $2.42 a gallon—an increase of 13%.

   At that rate, what will the average price of gasoline be in 2020?

   (From Unit 5, Lesson 16.)

7. A credit card charges a 14% annual nominal interest rate and has a balance of $500.

   If no payments are made and interest is compounded quarterly, which expression could be used to calculate the account balance, in dollars, in 3 years?

   A. $500 \cdot (1 + 0.14)^3$

   B. $500 \cdot \left(1 + \frac{0.14}{4}\right)^3$

   C. $500 \cdot \left(1 + \frac{0.14}{4}\right)^{12}$

   D. $500 \cdot \left(1 + \frac{0.14}{4}\right)^{48}$

   (From Unit 5, Lesson 17.)

8. Here are equations that define four linear functions. For each function, write a verbal description of what is done to the input to get the output, and then write the inverse function.

   a. $a(x) = x - 4$

   b. $b(x) = 2x - 4$

   c. $c(x) = 2(x - 4)$

   d. $d(x) = \frac{x}{4}$

   (From Unit 4, Lesson 17.)