

**Algebraic Reasoning**  
**Unit 4 Bundle 3 Summative Assessment**  
**Answer Key**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Multiple Choice

1. The function  $h(x)$  is the result of an operation on  $f(x)$  and  $g(x)$ . Find the function values for  $h(x)$  in the table, then use finite differences to determine a function rule for  $h(x)$ .

$x$	1	2	3	4	5	6	7
$f(x) = x^2 + 17$	18	21	26	33	42	53	66
$g(x) = 4x$	4	8	12	16	20	24	28
$h(x) = (f + g)(x)$	<b>22</b>	<b>29</b>	<b>38</b>	<b>49</b>	<b>62</b>	<b>77</b>	<b>96</b>

- A  $h(x) = 4x^3 + 17$   
B  $h(x) = x^2 + 4x + 17$   
C  $h(x) = x^2 + 21x$   
D  $h(x) = x^2 + 17(4x)$

2. Determine the operation that was used to create  $h(x)$ .

$x$	-2	-1	0	1	2
$f(x)$	-9	-3	3	9	15
$g(x)$	-6	-3	0	3	6
$h(x)$	-3	0	3	6	9

- A Addition  
B **Subtraction**  
C Multiplication  
D Division

3. Maddy earns a monthly salary of \$640 at a shipping company. She also earns a bonus of \$50 for each new customer she gets during the month. Her salary is then reduced by 25% for taxes and insurance. Which function best defines Maddy's net pay if  $s(x) = 640 + 50x$  represents her gross monthly salary, where  $x$  is the number of new customers, and  $w(x) = 0.25(640+50x)$  represents her withholdings?

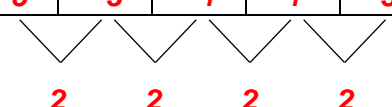
- A  $(s + w)(x) = 640 + 87.5x$   
 B  $(w - s)(x) = -480 - 37.5x$   
 C  $(s - w)(x) = 480 + 37.5x$   
 D  $(s \cdot w)(x) = (640 + 50x)(0.25(640+50x))$

4. David is building a scale model racing fence around the rectangular display mat for his model cars. The design of the mat calls for a length of 8 inches more than twice the width. The cost of the fence material is \$0.50 per inch. If  $x$  represents the width of the mat, write a function,  $c(x)$ , to represent the cost of the fencing.

- A  $c(x) = 6x + 16$   
 B  $c(x) = 3x + 16$   
 C  $c(x) = (0.5)(2x^2 + 8x)$   
 D  $c(x) = (0.5)(6x + 16)$

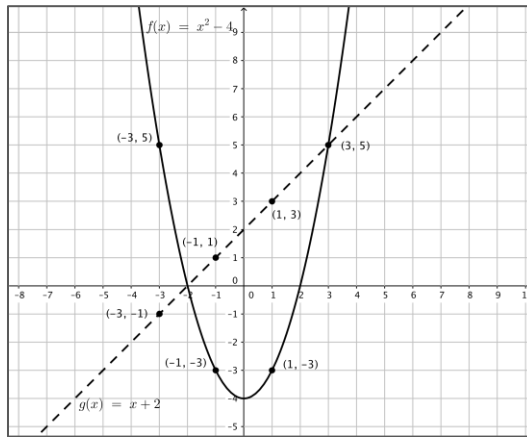
5. Use the table for the functions  $f(x)$  and  $g(x)$  to find the values for the quotient  $h(x) = f(x) \div g(x)$ . Then use finite differences to write the function rule for  $h(x)$ .

$x$	-2	-1	0	1	2
$f(x) = 2x^2 + 5x - 3$	-5	-6	-3	4	15
$g(x) = x + 3$	1	2	3	4	5
$h(x)$	-5	-3	-1	1	3


  
 2      2      2      2

- A  $h(x) = 2x - 1$   
 B  $h(x) = 2x - 5$   
 C  $h(x) = 2x - 3$   
 D  $h(x) = 2x$

6. Use the graph,  $f(x) = x^2 - 4$ , and  $g(x) = x + 2$  to determine values for  $h(x) = f(x) \div g(x)$  and write the equation for  $h(x)$ .



$x$	-3	-1	1	3
$f(x)$	5	-3	-3	5
$g(x)$	-1	1	3	5
$h(x)$	-5	-3	-1	1

- A**  $h(x) = x - 2$   
**B**  $h(x) = -2x - 2$   
**C**  $h(x) = 2x - 5$   
**D**  $h(x) = x + 2$

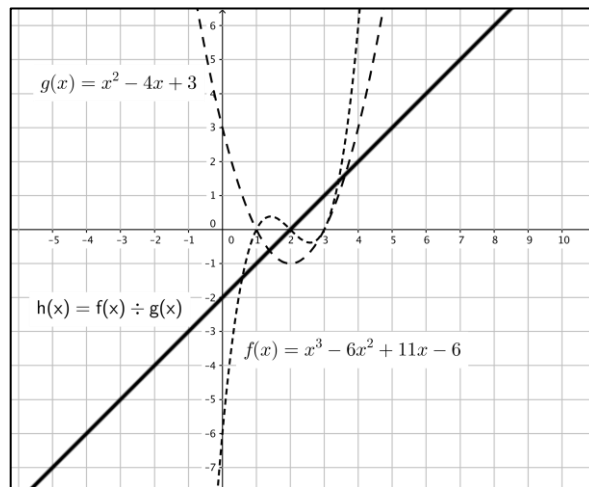
7. Find  $h(x) = f(x) \div g(x)$  and  $j(x) = g(x) \div f(x)$  for  $f(x) = 3x^2 + 2x - 8$  and  $g(x) = x + 2$ .

- A**  $h(x) = 3x + 4; j(x) = \frac{1}{3x+4}$   
**B**  $h(x) = 3x - 4; j(x) = \frac{1}{3x-4}$   
**C**  $h(x) = 3x - 4; j(x) = \frac{1}{3x+4}$   
**D**  $h(x) = 3x + 4; j(x) = \frac{1}{3x-4}$

8. If  $f(x) = x + 1.5$  and  $g(x) = 5x^2$ , what is  $g(f(x))$ ?

- A**  $g(f(x)) = 5x^3 + 7.5x^2$   
**B**  $g(f(x)) = 5x^2 + 11.25$   
**C**  $g(f(x)) = 5x^2 + 15x + 11.25$   
**D**  $g(f(x)) = 5x^2 + 15x + 2.25$

9. Use the graph and values for  $f(x) = x^3 - 6x^2 + 11x - 6$  and  $g(x) = x^2 - 4x + 3$  to complete the values for  $h(x) = f(x) \div g(x)$  in the table. Choose the equation representing the values for function  $h(x) = f(x) \div g(x)$ .



<b>x</b>	0	2	4
<b>h(x)</b>	<b>-2</b>	<b>0</b>	<b>2</b>

- A**  $h(x) = 2x + 1$
- B**  $h(x) = 2x$
- C**  $h(x) = x + 1$
- D**  $h(x) = x - 2$
10. The band is selling t-shirts as a fundraiser for new uniforms. The cost to produce the t-shirts is \$4 per shirt plus a one-time design fee of \$100. The team is selling the shirts for \$10 apiece. The function  $c(x) = 4x + 100$  can be used to represent the cost of producing  $x$  number of t-shirts. The function  $r(x) = 10x$  can be used to represent the amount of revenue the team would receive for selling  $x$  t-shirts. Choose the function  $p(x)$ , in terms of  $c(x)$  and  $r(x)$ , that can be used to calculate the profit the team would make from selling  $x$  t-shirts.

- A**  $p(x) = r(x) + c(x)$   
 $p(x) = 14x + 100$
- B**  $p(x) = c(x) - r(x)$   
 $p(x) = -6x + 100$
- C**  $p(x) = r(x) - c(x)$   
 $p(x) = 6x - 100$
- D**  $p(x) = r(x) \cdot c(x)$   
 $p(x) = 10x(4x + 100)$