NAME _____ DATE _____ PERIOD _____

6.1 Operations on Functions · Form A

All work must be completed on a separate sheet of paper, in a clear and organized manner.

Examples 1 and 2

Find $(f+g)(x)$, $(f-g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$.

1. $f(x) = x - 1$
$g(x) = 5x - 2$

2. $f(x) = x^2$
$g(x) = x - 5$

3. $f(x) = 3x^2 - 4$
$g(x) = x^2 - 8x + 4$

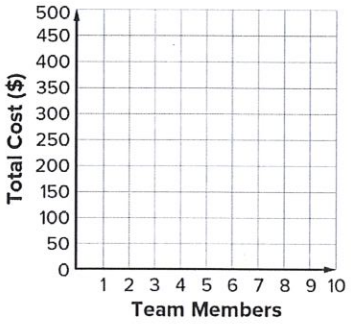
$(f+g)(x)$			
$(f-g)(x)$			
$(f*g)(x)$			
$(\frac{f}{g})(x)$			

Example 3

4. BASEBALL A coach is ordering custom practice T-shirts and game jerseys for each of the team members. The coach orders T-shirts from a local shop that charges \$7.50 for each, plus a \$35 initial printer fee. The cost of the T-shirts is modeled by $t(x) = 7.5x + 35$, where x is the number of team members. He orders jerseys online, which cost \$18 each with \$20 shipping. The cost of the jerseys is modeled by $j(x) = 18x + 20$. Define and graph the function that represents the total cost of the T-shirts and jerseys.

a. Identify and write a new function to represent total cost.

b. Graph the combined function.



Examples 4

For each pair of functions, find $f \circ g$ and $g \circ f$, if they exist. State the domain and range for each.

5. $f = \{(-7, 0), (4, 5), (8, 12), (-3, 6)\}$
$g = \{(6, 8), (-12, -5), (0, 5), (5, 1)\}$

6. $f = \{(-4, -14), (0, -6), (-6, -18), (2, -2)\}$
$g = \{(-6, 1), (-18, 13), (-14, 9), (-2, -3)\}$

Examples 5

Find $[f \circ g](x)$ and $[g \circ f](x)$, if they exist. State the domain and range for each.

7. $f(x) = -3x$
$g(x) = -x + 8$

8. $f(x) = 2x^2 - x + 1$
$g(x) = 4x + 3$

Example 6

9. REASONING A sporting goods store is offering a 20% discount on shoes. Mariana also has a \$5 off coupon that can be applied to her purchase. She is planning to buy a pair of shoes that originally costs \$89. Will the final price be lower if the discount is applied before the coupon or if the coupon is applied before the discount? Justify your response.

NAME _____ DATE _____ PERIOD _____

Mixed Exercises

10. CONSTRUCT ARGUMENTS Is $[f \circ g](x)$ always equal to $[g \circ f](x)$ for two functions $f(x)$ and $g(x)$? Justify your conclusions. Provide a counterexample if needed.

If $f(x) = 3x$, $g(x) = x + 4$, and $h(x) = x^2 - 1$, find each value.

11. $g[h(0)]$

12. $h[f(5)]$

13. $h[f(10)]$

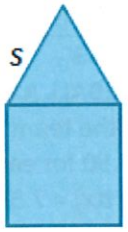
14. $[f \circ (h \circ g)](1)$

15. $h[f(-6)]$

16. $f[g(7)]$

17. $[g \circ (f \circ h)](-1)$

~~**36. AREA** Valeria wants to know the area of a figure made by joining an equilateral triangle and square along an edge. The function $f(s) = \frac{\sqrt{3}}{4}s^2$ gives the area of an equilateral triangle with side s. The function $g(s) = s^2$ gives the area of a square with side s. What function $h(s)$ gives the area of the figure as a function of its side length s?~~



~~**38. REASONING** The National Center for Education Statistics reports data showing that since 2006, college enrollment for men in thousands can be modeled by $f(x) = 389x + 7500$, where x represents the number of years since 2006. Similarly, enrollment for women can be modeled by $g(x) = 480x + 10{,}075$. Write a function for $(f + g)(x)$ and interpret what it represents.~~

~~**41. CREATE** Write two functions $f(x)$ and $g(x)$ such that $(f \circ g)(4) = 0$.~~

~~**43. PERSEVERE** Given $f(x) = \sqrt{x^3}$ and $g(x) = \sqrt{x^6}$, determine each domain.~~

~~**a.** $g(x) \cdot g(x)$~~ ~~**b.** $f(x) \cdot f(x)$~~