Given $f(x) = 2x^2 + 4x - 3$ and $g(x) = 5x - 2$, find each function. (Lesson 6-1)

1. $(f + g)(x)$ **$(f + g)(x) = 2x^2 + 9x - 5$**
2. $(f - g)(x)$ **$(f - g)(x) = 2x^2 - x - 1$**
3. $(f \cdot g)(x)$ **$(f \cdot g)(x) = 10x^3 + 16x^2 - 23x + 6$**
4. $\left(\frac{f}{g}\right)(x)$ **See margin.**
5. $[f \circ g](x)$ **$(f \circ g)(x) = 50x^2 - 20x - 3$**
6. $[g \circ f](x)$ **$(g \circ f)(x) = 10x^2 + 20x - 17$**

7. **SHOPPING** Mrs. Ross is shopping for her children's school clothes. She has a coupon for 25% off her total. The sales tax of 6% is added to the total after the coupon is applied. (Lesson 6-1)

   a. Express the total price after the discount and the total price after the tax using function notation. Let x represent the price of the clothing, $p(x)$ represent the price after the 25% discount, and $g(x)$ represent the price after the tax is added. **$p(x) = 0.75x$, $g(x) = 1.06x$**

   b. Which composition of functions represents the final price, $p[g(x)]$ or $g[p(x)]$? Explain your reasoning. **Since $p[g(x)] = g[p(x)]$, either function represents the price.**

Graph each inequality. (Lesson 6-3)

17. $y < \sqrt{x - 5}$
18. $y \leq -2\sqrt{x}$
19. $y > \sqrt{x + 9} + 3$
20. $y \geq \sqrt{x + 4} - 5$

17–20. See Chapter 6 Answer Appendix.

Graph each function. State the domain and range of each function. (Lesson 6-3) **21, 22. See Chapter 6 Answer Appendix.**

21. $y = 2 + \sqrt{x}$
22. $y = \sqrt{x + 4} - 1$

23. **MULTIPLE CHOICE** What is the domain of $f(x) = \sqrt{2x + 5}$? (Lesson 6-3) **D**

   A $\left\{x \middle| x > \frac{5}{2}\right\}$

   B $\left\{x \middle| x > -\frac{5}{2}\right\}$

   C $\left\{x \middle| x \geq \frac{5}{2}\right\}$

   D $\left\{x \middle| x \geq -\frac{5}{2}\right\}$

Simplify. (Lesson 6-4)

24. $\pm\sqrt{121a^4b^{18}}$ **$\pm 11a^2|b^9|$**
25. $\sqrt{(x^4 + 3)^{12}}$ **$(x^4 + 3)^6$**
26. $\sqrt[3]{27(2x - 5)^{15}}$ **$3(2x - 5)^5$**
27. $\sqrt[5]{-(y - 6)^{20}}$ **$-(y - 6)^4$**
28. $\sqrt[3]{8(x + 4)^6}$ **$2(x + 4)^2$**
29. $\sqrt[4]{16(y + x)^8}$ **$2(y + x)^2$**

<u>skip #17-20!</u>

Determine whether each pair of functions are inverse functions. Write *yes* or *no*. (Lesson 6-2)

8. $f(x) = 2x + 16$
$g(x) = \frac{1}{2}x - 8$ **yes**

9. $g(x) = 4x + 15$
$h(x) = \frac{1}{4}x - 15$ **no**

10. $f(x) = x^2 - 5$
$g(x) = 5 + x^{-2}$ **no**

11. $g(x) = -6x + 8$
$h(x) = \frac{8 - x}{6}$ **yes**

Find the inverse of each function, if it exists. (Lesson 6-2)
12–15. See margin.

12. $h(x) = \frac{2}{5}x + 8$

13. $f(x) = \frac{4}{9}(x - 3)$

14. $h(x) = -\frac{10}{3}(x + 5)$

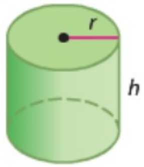
15. $f(x) = \frac{x + 12}{7}$

16. **JOBS** Louise runs a lawn care service. She charges \$25 for supplies plus \$15 per hour. The function $f(h) = 15h + 25$ gives the cost $f(h)$ for h hours of work. (Lesson 6-2)

a. Find $f^{-1}(h)$. What is the significance of $f^{-1}(h)$?
See Chapter 6 Answer Appendix.

b. If Louise charges a customer \$85, how many hours did she work? **4 hours**

30. **MULTIPLE CHOICE** The radius of the cylinder below is equal to the height of the cylinder. The radius r can be found using the formula $r = \sqrt[3]{\frac{V}{\pi}}$. Find the radius of the cylinder if the volume is 500 cubic inches. (Lesson 6-4) **G**



F 2.53 inches

G 5.42 inches

H 7.94 inches

J 24.92 inches

31. **PRODUCTION** The cost in dollars of producing p cell phones in a factory is represented by $C(p) = 5p + 60$. The number of cell phones produced in h hours is represented by $P(h) = 40h$. (Lesson 6-1)

a. Find the composition function. $C[P(h)] = 200h + 60$

b. Determine the cost of producing cell phones for 8 hours. **\$1660**

Additional Answers

4. $\left(\frac{f}{g}\right)(x) = \frac{2x^2 + 4x - 3}{5x - 2}, x \neq \frac{2}{5}$

12. $h^{-1}(x) = \frac{5}{2}(x - 8)$

13. $f^{-1}(x) = \frac{9}{4}x + 3$

14. $h^{-1}(x) = -\frac{3}{10}x - 5$

15. $f^{-1}(x) = 7x - 12$