

Mid-Chapter Quiz: Lessons 6-1 through 6-4

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

1. $(f + g)(x)$

ANSWER:

$$(f + g)(x) = 2x^2 + 9x - 5$$

2. $(f - g)(x)$

ANSWER:

$$(f - g)(x) = 2x^2 - x - 1$$

3. $(f \cdot g)(x)$

ANSWER:

$$(f \cdot g)(x) = 10x^3 + 16x^2 - 23x + 6$$

4. $\left(\frac{f}{g}\right)(x)$

ANSWER:

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

5. $[f \circ g](x)$

ANSWER:

$$[f \circ g](x) = 50x^2 - 20x - 3$$

6. $[g \circ f](x)$

ANSWER:

$$[g \circ f](x) = 10x^2 + 20x - 17$$

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.

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.

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

ANSWER:

a. $p(x) = 0.75x$, $g(x) = 1.06x$

b. Since $g[p(x)] = g[p(x)]$; either function represents the price.

Determine whether each pair of functions are inverse functions. Write yes or no.

$$f(x) = 2x + 16$$

8. $g(x) = \frac{1}{2}x - 8$

ANSWER:

Yes

$$g(x) = 4x + 15$$

9. $h(x) = \frac{1}{4}x - 15$

ANSWER:

No

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10. $f(x) = x^2 - 5$
 $g(x) = 5 + x^{-2}$

ANSWER:

No

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

ANSWER:

Yes

Find the inverse of each function, if it exists.

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

ANSWER:

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

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

ANSWER:

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

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

ANSWER:

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

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

ANSWER:

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

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.

a. Find $f^{-1}(h)$. What is the significance of $f^{-1}(h)$?

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

ANSWER:

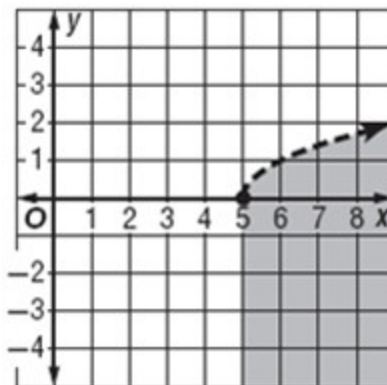
a. $f^{-1}(h) = \frac{1}{15}h - \frac{5}{3}$; $f^{-1}(h)$ represents the number of hours worked

b. 4 hours

Graph each inequality.

17. $y < \sqrt{x-5}$

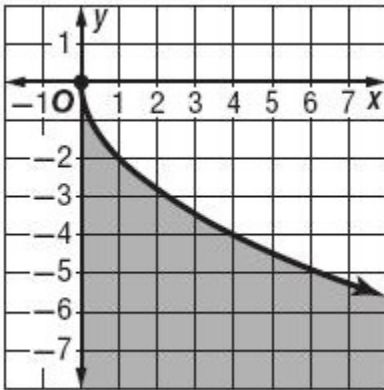
ANSWER:



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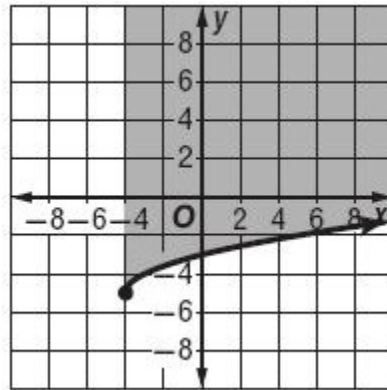
18. $y \leq -2\sqrt{x}$

ANSWER:



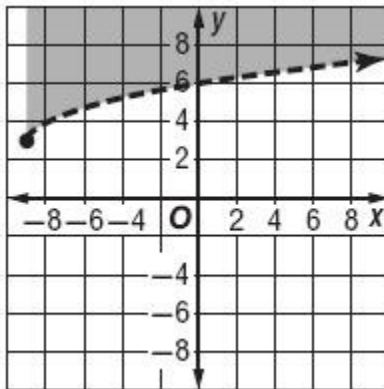
20. $y \geq \sqrt{x+4} - 5$

ANSWER:



19. $y > \sqrt{x+9} + 3$

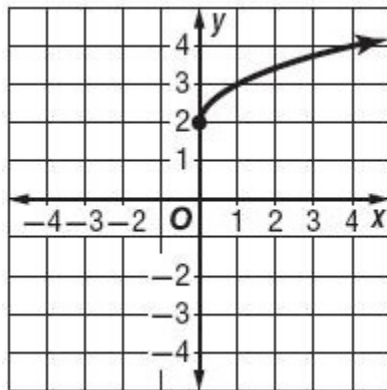
ANSWER:



Graph each function. State the domain and range of each function.

21. $y = 2 + \sqrt{x}$

ANSWER:

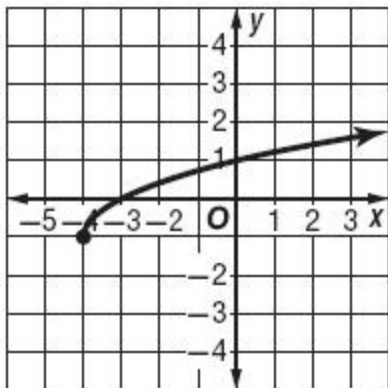


$D = \{x \mid x \geq 0\}; R = \{y \mid y \geq 2\}$

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

ANSWER:



$D = \{x \mid x \geq -4\}; R = \{y \mid y \geq -1\}$

23. **MULTIPLE CHOICE** What is the domain of

$f(x) = \sqrt{2x+5}$?

- A. $\left\{x \mid x > \frac{5}{2}\right\}$
- B. $\left\{x \mid x > -\frac{5}{2}\right\}$
- C. $\left\{x \mid x \geq \frac{5}{2}\right\}$
- D. $\left\{x \mid x \geq -\frac{5}{2}\right\}$

ANSWER:

D

Simplify.

24. $\pm\sqrt{121a^4b^{18}}$

ANSWER:

$\pm 11a^2|b^9|$

25. $\sqrt{(x^4+3)^{12}}$

ANSWER:

$(x^4+3)^6$

26. $\sqrt[3]{27(2x-5)^{15}}$

ANSWER:

$3(2x-5)^5$

27. $\sqrt[5]{-(y-6)^{20}}$

ANSWER:

$-(y-6)^4$

28. $\sqrt[3]{8(x+4)^6}$

ANSWER:

$2(x+4)^2$

29. $\sqrt[4]{16(y+x)^8}$

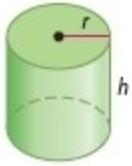
ANSWER:

$2(y+x)^2$

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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.



F 2.53 inches

G 5.42 inches

H 7.94 inches

J 24.92 inches

ANSWER:

G

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

a. Find the composition function.

b. Determine the cost of producing cell phones for 8 hours.

ANSWER:

a. $C[P(h)] = 200h + 60$

b. \$1660