

PreCalculus Summer Assignment**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. Find the slope of the line passing through the pair of points.

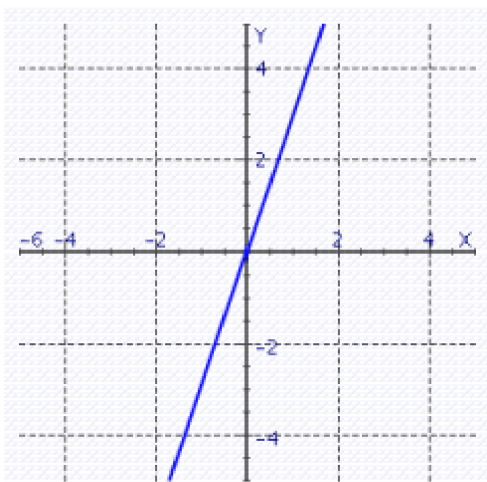
$$P(5, \sqrt{18}); Q(\sqrt{18}, 5)$$

- a. $m = 5$
- b. $m = 1$
- c. $m = 2$
- d. $m = -1$
- e. none of these

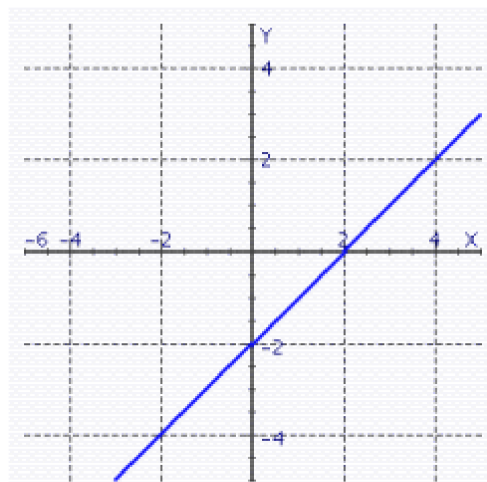
- _____ 2. Draw the line using the slope and y-intercept.

$$y + 2 = 3x$$

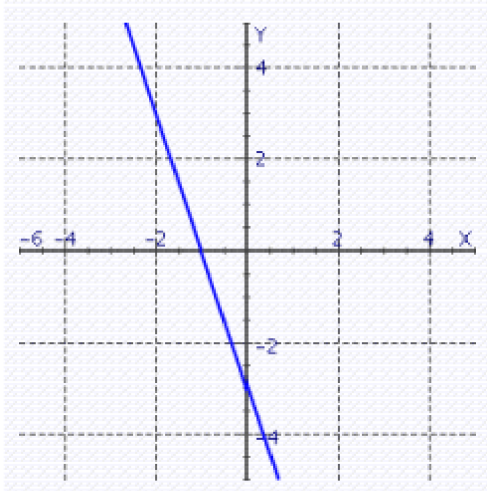
a.



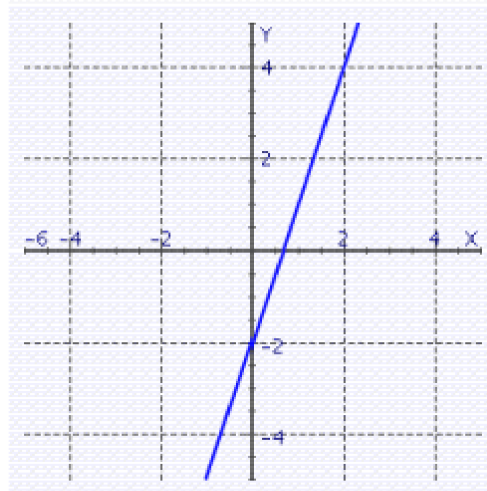
c.



b.



d.



_____ 3. Find the y-intercept of the line determined by the equation.

$$-7x + 5y = 3$$

- a. $(0, \frac{7}{5})$
- b. $(0, \frac{3}{5})$
- c. $(0, -\frac{3}{5})$
- d. $(-\frac{7}{5}, 0)$
- e. $(0, -\frac{7}{5})$

_____ 4. Find the slope of the line determined by the equation.

$$3x + 10y = 11$$

- a. $m = -3$
- b. $m = 3$
- c. $m = -\frac{3}{10}$
- d. $m = \frac{11}{10}$
- e. $m = -10$

_____ 5. Write the equation of the line that passes through the point $P(3, 4)$ and is perpendicular to the line $y = -5x + 8$.

- a. $y = \frac{1}{5}x + 8$
- b. $y = \frac{1}{5}x + 4.6$
- c. $y = \frac{1}{5}x + 3.4$
- d. $x = 3.4y + \frac{1}{5}$
- e. $y = x + 3.4$

_____ 6. Evaluate the function at the specified value of the independent variable and simplify.

$$q(x) = \frac{-2x}{3x+5}$$

$$q(y-3)$$

a. $\frac{-2y+6}{3y-4}$

b. $\frac{-2y-6}{3y-4}$

c. $\frac{-2x+6}{3x-4}$

d. $\frac{3}{7}$

e. $-\frac{3}{2}$

_____ 7. Evaluate the function at the specified value of the independent variable and simplify.

$$g(w) = \begin{cases} 2w, & w \leq -1 \\ 2w^2 + 2w, & -1 \leq w \leq 1 \\ 2w^3 + 2w^2, & w > 1 \end{cases}$$

$$g\left(\frac{1}{4}\right)$$

a. $\frac{1}{16}$

b. $\frac{1}{5}$

c. $\frac{1}{2}$

d. $\frac{5}{8}$

e. $\frac{5}{32}$

_____ 8. Find all real values of x such that $f(x) = 0$.

$$f(x) = \frac{-6x - 9}{2}$$

- a. $-\frac{3}{4}$
- b. $\pm\frac{3}{4}$
- c. $\pm\frac{3}{2}$
- d. $-\frac{3}{2}$
- e. $\frac{3}{2}$

_____ 9. Find the value(s) of x for which $f(x) = g(x)$.

$$f(x) = x^2 + 7x + 33 \qquad g(x) = -6x - 9$$

- a. $33, 26, -\frac{3}{2}$
- b. $33, 7, -\frac{3}{2}$
- c. $-6, -7$
- d. $6, 7$
- e. $-40, -\frac{3}{2}$

_____ 10. Find the domain of the function.

$$q(s) = \frac{8s}{s - 6}$$

- a. all real numbers $s \neq 6$
- b. all real numbers $s \neq 6, s \neq 0$
- c. all real numbers
- d. $s = 6, s = 0$
- e. $s = 6$

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_____ 11. Find the domain of the function.

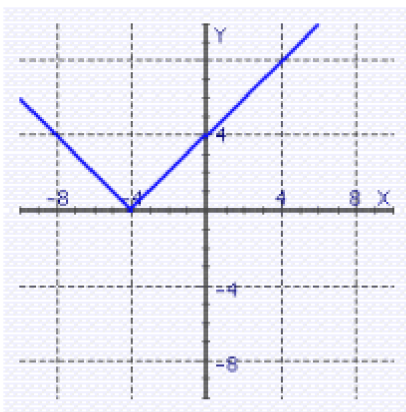
$$q(s) = \sqrt{64 - s^2}$$

- a. $-8 \leq s \leq 8$
- b. $s \leq -8$ or $s \geq 8$
- c. $s \geq 0$
- d. $s \leq 8$
- e. all real numbers

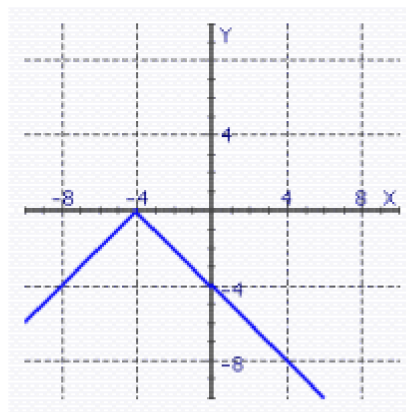
_____ 12. Find the graph of the equation.

$$f(x) = |x - 4|$$

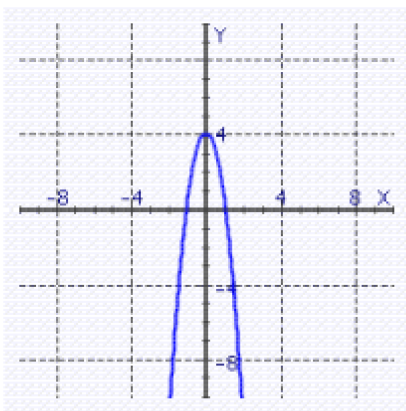
a.



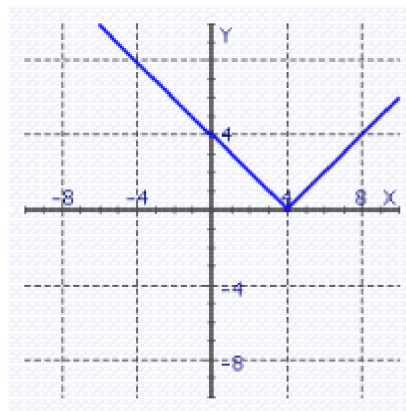
c.



b.

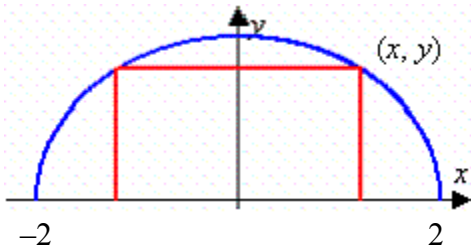


d.



- _____ 13. A rectangle is bounded by the x -axis and the semicircle $y = \sqrt{4 - x^2}$ (see figure). Write the area A of the rectangle as a function of x and determine the domain of the function.

$$y = \sqrt{4 - x^2}$$



- a. $A(x) = 2|x|\sqrt{4 - x^2}$, $-2 \leq x \leq 2$
 b. $A(x) = 2x\sqrt{4 - x^2}$, $x \geq 0$
 c. $A(x) = 2x\sqrt{4 - x^2}$, $-2 \leq x \leq 2$
 d. $A(x) = |x|\sqrt{4 - x^2}$, all real numbers
 e. $A(x) = x\sqrt{4 - x^2}$, $x \geq 0$
- _____ 14. Find the difference quotient and simplify your answer.

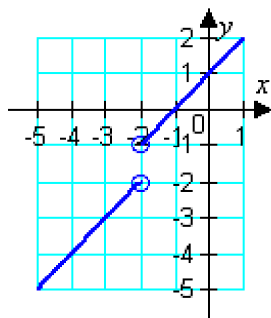
$$f(y) = -4y^2 + 6y, \frac{f(1 + h) - f(1)}{h}, h \neq 0$$

- a. $8 + h$
 b. $-2 - 4y + \frac{12}{y}$
 c. $6 - 4y + \frac{12}{y}$
 d. $6 - 4h$
 e. $-2 - 4h$

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_____ 15. Use the graph of the function to find the domain and range of f .



- a. domain: all real numbers
range: $(-\infty, -2) \cup (-1, \infty)$
- b. domain: all real numbers
range: all real numbers
- c. domain: $(-\infty, -2) \cup (-2, \infty)$
range: $(-\infty, -2) \cup (-1, \infty)$
- d. domain: $(-\infty, -2) \cup (-1, \infty)$
range: $(-\infty, -2) \cup (-2, \infty)$
- e. domain: all real numbers
range: $(-\infty, -2] \cup [-1, \infty)$

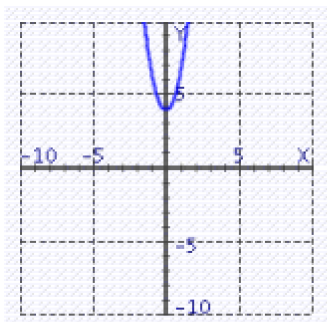
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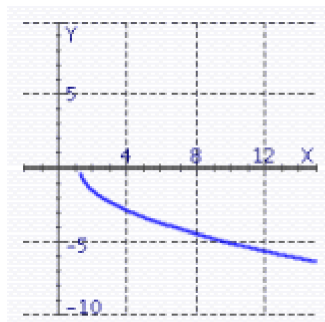
_____ 16. Find the graph of the equation.

$$f(x) = \sqrt{3x - 4}$$

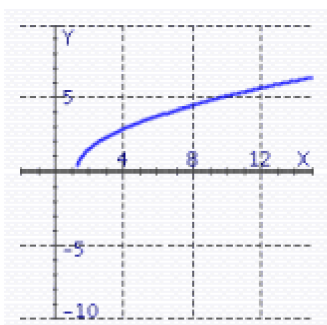
a.



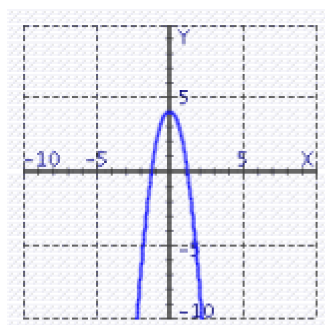
c.



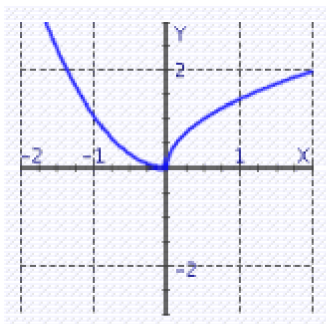
b.



d.



_____ 17. Tell where the function is decreasing.

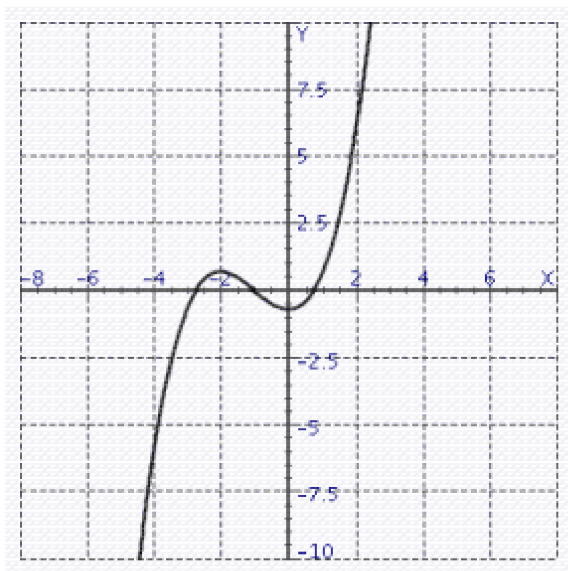


- a. $(0, \infty)$
- b. $(-\infty, 0)$
- c. always increasing
- d. always constant
- e. always decreasing

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_____ 18. The graph of a function is sketched below.



Determine the interval on which the function is decreasing.

- a. $(-\infty, -2] \cap [0, \infty)$
- b. $[-2, 0]$
- c. $[0, 0]$
- d. $[0, 2]$
- e. $(-\infty, -2] \cup [0, \infty)$

- _____ 19. Use a graphing utility to graph the function and visually determine the intervals over which the function is increasing, decreasing, or constant.

$$f(x) = -x^3 + 3x + 1$$

a. increasing on $(-\infty, -1)$

decreasing on $(-1, 1)$

increasing on $(1, \infty)$

b. decreasing on $(-\infty, 0)$

increasing on $(0, \infty)$

c. decreasing on $(-\infty, \infty)$

d. increasing on $(-\infty, \infty)$

e. decreasing on $(-\infty, -1)$

increasing on $(-1, 1)$

decreasing on $(1, \infty)$

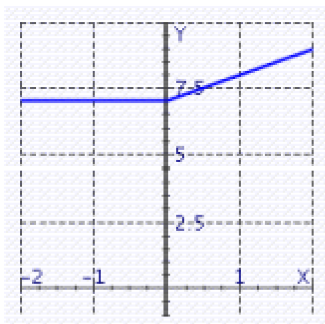
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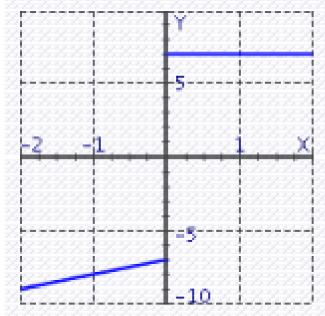
_____ 20. Graph the piecewise-defined function.

$$y = f(x) = \begin{cases} x + 7 & \text{if } x < 0 \\ 7 & \text{if } x \geq 0 \end{cases}$$

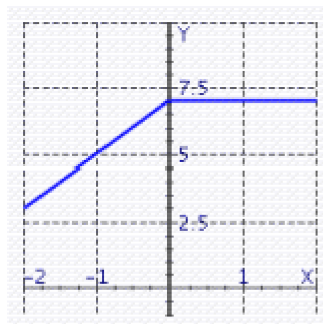
a.



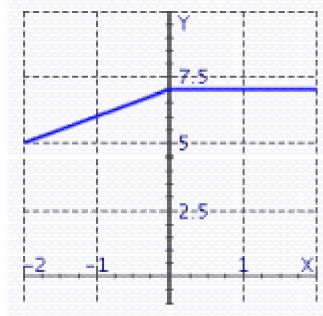
b.



c.



d.



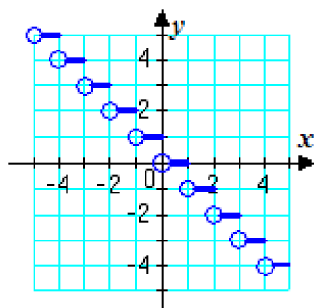
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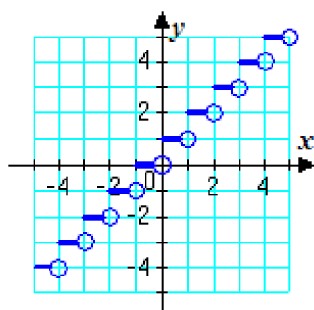
_____ 21. Which graph represents the function?

$$g(x) = \llbracket x - 1 \rrbracket$$

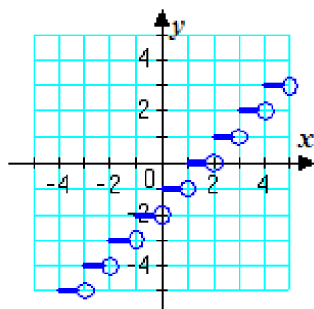
a.



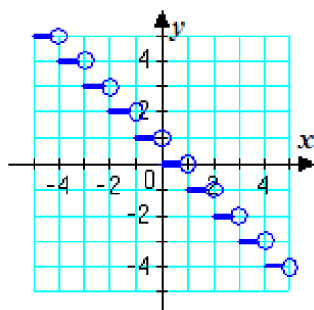
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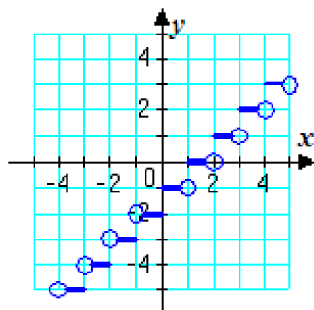
c.



d.



e.



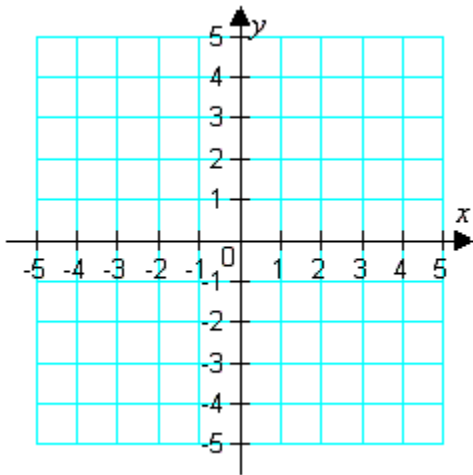
_____ 22. Determine whether the function is even, odd, or neither.

$$f(x) = 7x^{\frac{3}{4}}$$

- a. even
- b. odd
- c. neither

_____ 23. Graph the function and determine the interval(s) for which $f(x) \geq 0$.

$$f(x) = -x^2 - 4x$$



- a. $(-\infty, -4] \cup [0, \infty)$
- b. $[-4, 0]$
- c. $(-4, 0)$
- d. $(-\infty, -4) \cup (0, \infty)$
- e. $\{-4\}$

_____ 24. Find the distance between the two points $(10, -8)$ and $(10, 5)$.

- a. 26
- b. 18
- c. 13
- d. 34
- e. 5

_____ 25. Find the midpoint between the two points $(2, 7)$ and $(4, -19)$.

- a. $(-1, -13)$
- b. $(-1, -6)$
- c. $(6, -6)$
- d. $(3, -6)$
- e. $(3, -13)$

_____ 26. Describe the sequence of transformations from the related common function $f(x) = x^3$ to g .

$$g(x) = 4(x - 4)^3$$

- a. horizontal shift 4 units right; then vertical stretch by a factor of 4
- b. horizontal shift 4 units left; then vertical stretch by a factor of 4
- c. horizontal shift 4 units left; then vertical shrink by a factor of 4
- d. vertical shift 4 units up; then vertical shrink by a factor of 4
- e. vertical shift 4 units down; then vertical shrink by a factor of 4

_____ 27. Describe the sequence of transformations from the related common function $f(x) = \sqrt{x}$ to g .

$$g(x) = -\sqrt{x} + 6$$

- a. reflection in the x -axis; then vertical shift 6 units down
- b. reflection in the x -axis; then vertical shift 6 units up
- c. reflection in the y -axis; then vertical shift 6 units up
- d. reflection in the y -axis; then horizontal shift 6 units right
- e. reflection in the y -axis; then horizontal shift 6 units left

_____ 28. Find all vertical and horizontal asymptotes of the function.

$$f(x) = \frac{1}{x - 2}$$

- a. Horizontal : $y = 0$, Vertical : $x = 2$
- b. Horizontal : $y = 1$, Vertical : $x = -2$
- c. Horizontal : $y = -1$, Vertical : $x = 2$
- d. Horizontal : $y = 1$, Vertical : $x = 2$
- e. Horizontal : $y = 0$, Vertical : $x = -2$

_____ 29. Find $(fg)(x)$.

$$f(x) = \sqrt{-2x} \quad g(x) = \sqrt{-9x-1}$$

a. $(fg)(x) = 3x\sqrt{2} + \sqrt{2x}$

b. $(fg)(x) = 3x\sqrt{2+2x}$

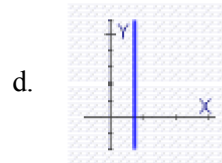
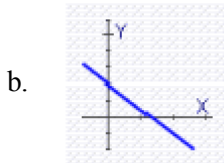
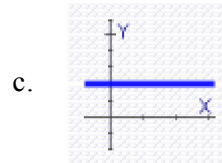
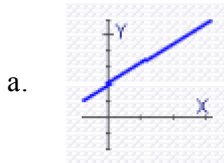
c. $(fg)(x) = \sqrt{-11x-1}$

d. $(fg)(x) = \sqrt{18x^2-1}$

e. $(fg)(x) = \sqrt{18x^2+2x}$

Matching

Tell whether the slope of the line is positive, negative, 0, or undefined.
Choose the correct letter for each question.



_____ 30. undefined slope

_____ 31. negative slope

_____ 32. zero slope

_____ 33. positive slope

Determine whether the line through the given points and the line through $R(8,7)$ and $S(5,14)$ are parallel, perpendicular, or neither.

Choose the correct letter for each question.

a. $P(16,14); Q(10,28)$

c. $P(14,14); Q(0,-10)$

b. $P(21,-24); Q(42,-15)$

_____ 34. perpendicular

_____ 35. neither

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_____ 36. parallel

Short Answer

37. A line passes through the two points $P(1,1)$, and $Q(-1, -1)$. Write the equation in slope-intercept form.

38. Let the function f be defined by the equation $y = f(x)$, where x and $f(x)$ are real numbers. Find the domain of the function $f(x) = \sqrt{16x^2 - 4}$.

Please enter your answer in interval notation.

39. Find the inverse of the one-to-one function.

$$y = 9x$$

$$f^{-1}(x) = \underline{\hspace{2cm}}$$

40. Find the inverse of the one-to-one function.

$$y = \frac{1}{3x}$$

$$f^{-1}(x) = \underline{\hspace{2cm}}$$

41. Find the inverse of the one-to-one function.

$$y = 8x + 4$$

$$f^{-1}(x) = \underline{\hspace{2cm}}$$

42. Show algebraically that f and g are inverse functions.

$$f(x) = 9x - 8 \qquad g(x) = \frac{x + 8}{9}$$