Student: Fernando Heidercheidt **Submitted:** 07/25/25 11:06	**Instructor:** Fernando Heidercheidt **Course:** Su25 Math 1020/1021 Sec 101 Heidercheidt	**Assignment:** PRACTICE Exam 1: 1.1, 1.4, 1.6 - 1.8, 2.1 - 2.4, 3.1 - 3.6 **NOT GRADED** password: notforagrade

1. Determine if the given pair of functions are inverse functions of each other using the composition cancellation equations.

$f(x) = (x-7)^2$, $x \geq 7$ and $g(x) = \sqrt{x} + 7$

Select the correct choice and fill in the answer boxes within your choice.

(Simplify your answers.)

- **A.** f(x) and g(x) are inverse functions of each other because f(g(x)) = x and g(f(x)) = x.
- **B.** f(x) and g(x) are not inverse functions of each other because f(g(x)) = ____ and g(f(x)) = ____.

2. Solve the equation or state that there is no solution.

$$\frac{7x}{x-3} + 1 = \frac{21}{x-3}$$

What is the solution? Select the correct choice and, if necessary, fill in the answer box to complete your choice.

- **A.** x = ____ (Type an integer or a simplified fraction.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

3. Determine whether the function is one-to-one.

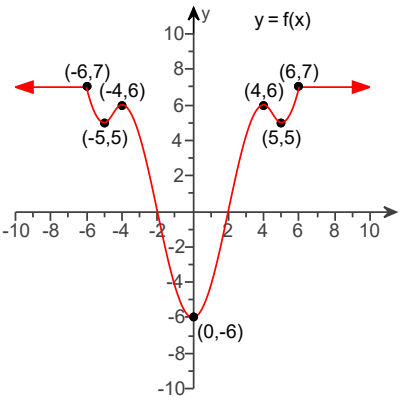
$f(x) = 7\sqrt{x}$

Is the function one-to-one?

- No
- Yes

YOU ANSWERED: No

4. Use the graph of y = f(x) to answer the questions. Complete parts **h** through **j**.



h. For what values of x is f(x) > 0?

The set of x-values for which f(x) > 0 is $(-\infty, -2) \cup (2, \infty)$.
(Type your answer in interval notation.)

i. Determine whether f(6) > f(3) is true or false. Choose the correct answer.

- **A.** False; because the y-value where x = 6 is less than the y-value where x = 3.
- **B.** False; because the y-value where x = 6 is greater than the y-value where x = 3.
- **C.** True; because the y-value where x = 6 is less than the y-value where x = 3.
- **D.** True; because the y-value where x = 6 is greater than the y-value where x = 3.

j. For what value(s) of x is f(x) = 7?

The set of x-values for which f(x) = 7 is $(-\infty, -6] \cup [6, \infty)$.
(Type your answer in interval notation.)

5. Evaluate the composite function given that $f(x) = 2x + 5$ and $h(x) = \sqrt{x + 3}$.

$(f \circ h)(1)$

$(f \circ h)(1) =$ 9 (Simplify your answer.)

*6. Write the standard equation of the circle with center $(-2, -9)$ and $r = \sqrt{6}$.

The standard form of the equation of the circle is $(x + 2)^2 + (y + 9)^2 = 6$.
(Type an equation. Simplify your answer.)

7. Follow the step by step process to determine the difference quotient, $\frac{f(x + h) - f(x)}{h}$.

$f(x) = x^2 - 3x$

a. Determine $f(x + h)$.

$f(x + h) =$ $x^2 + 2hx + h^2 - 3x - 3h$
(Simplify your answer.)

b. Simplify the expression $f(x + h) - f(x)$.

$f(x + h) - f(x) =$ $2hx + h^2 - 3h$
(Simplify your answer.)

c. Determine the difference quotient $\frac{f(x + h) - f(x)}{h}$.

$\frac{f(x + h) - f(x)}{h} =$ $h + 2x - 3$
(Simplify your answer.)

8. Solve the equation.

$2c^3 + 14c^2 - 16c = 0$

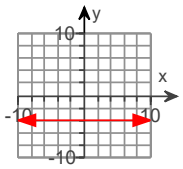
The solution set is $\{$ 1, −8, 0 $\}$.
(Simplify your answer. Type an exact answer, using radicals as needed. Express complex numbers in terms of *i*. Use a comma to separate answers as needed. Type each solution only once.)

9. Sketch the graph of the following function, and identify all properties that apply.

$f(x) = -4$

Choose the correct graph below.

A.



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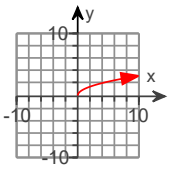
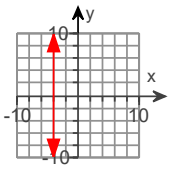
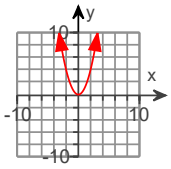


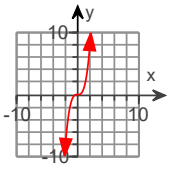
C.



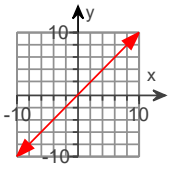
D.



E.



F.



Identify the properties. Select all that apply.

- [ ] **A.** The range of f is $(-\infty,\infty)$.
- [x] **B.** The function f is a linear function.
- [x] **C.** The domain of f is $(-\infty,\infty)$.
- [ ] **D.** The function is increasing on the interval $(-\infty,\infty)$.
- [ ] **E.** The function f is an odd function.
- [x] **F.** The function f is an even function.
- [ ] **G.** None of the above properties apply.

10. Determine whether the following equation represents y as a function of x.

$x^7 + y^7 = 2187$

Does the equation $x^7 + y^7 = 2187$ represent y as a function of x?

- (•) Yes
- ( ) No

11. Evaluate the following function at the values -5, 9, and a.

$f(t) = \dfrac{t}{t+3}$

$f(-5) =$ $\dfrac{5}{2}$ (Simplify your answer.)

$f(9) =$ $\dfrac{3}{4}$ (Simplify your answer.)

$f(a) =$ $\dfrac{a}{a+3}$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

YOU ANSWERED: $-\dfrac{5}{2}$

12. Find the center and radius of the circle.

$$x^2 + y^2 - 8x - 14y + 61 = 0$$

The center is (4, 7).
(Type an ordered pair.)

The radius is 2.
(Simplify your answer. Type an exact answer, using radicals as needed.)

13. Follow the Step-by-Step process to solve the linear equation.
a) Determine the LCD of all denominators in the given linear equation.
b) Write the new linear equation obtained after multiplying both sides of the original equation by the LCD.
c) Solve the equation.

$$\frac{x-3}{3} - \frac{x+3}{6} = \frac{4x-3}{6}$$

a) The LCD is 6.
(Simplify your answer.)

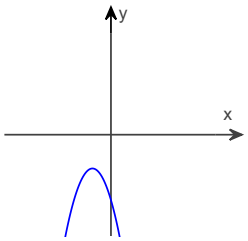
b) What is the new equation?

- **A.** $6(x-3) - (x+3) = 4x - 3$
- **B.** $(x-3) - (x+3) = 4x - 3$
- **C.** $2(x-3) - (x+3) = 4x - 3$
- **D.** $6(x-3) - 6(x+3) = 6(4x-3)$

c) What is the solution? Select the correct choice and, if necessary, fill in the answer box to complete your choice.

- **A.** $x =$ −2 (Type an integer or a simplified fraction.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

14. Use the vertical line test to determine if y is a function of x in the graph.



Choose the correct answer below.

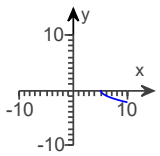
- y is a function of x
- y is not a function of x

15. Use the graph of the known basic function and a combination of horizontal shifts, reflections, and vertical shifts to sketch the function.

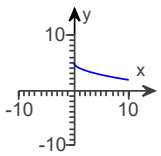
$g(x) = -\sqrt{x} + 5$

Choose the correct sketch below.

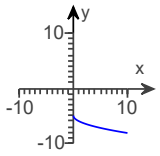
A.



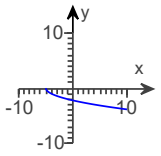
B.

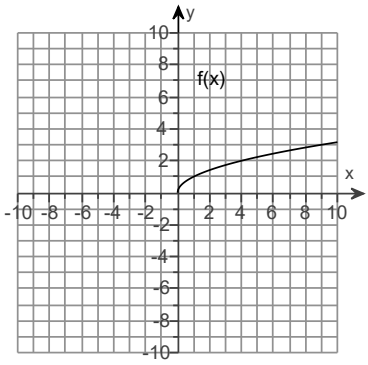


C.



D.





16. Complete parts a through d to follow the step-by-step procedure to determine if the following function is even, odd, or neither.

$f(x) = x^7 - 5x^3$

a) If f is an even function, then which of the following is true?

A. $f(x) = -f(x)$

B. $f(x) = \dfrac{1}{f(x)}$

C. $f(-x) = f(x)$

D. $f(-x) = -f(x)$

b) If f is an odd function, then which of the following is true?

A. $f(x) = \dfrac{1}{f(x)}$

B. $f(-x) = f(x)$

C. $f(x) = -f(x)$

D. $f(-x) = -f(x)$

c) Determine $f(-x)$ and simplify.

$f(-x) =$ $-x^7 + 5x^3$

(Simplify your answer. Do not factor.)

d) Is the given function even, odd, or neither?

A. The function is even.

B. The function is odd.

C. The function is neither even nor odd.

17. Classify the given function as a polynomial function, rational function, or root function, and then find the domain. Write the domain in interval notation.

$g(x) = 2x - 6$

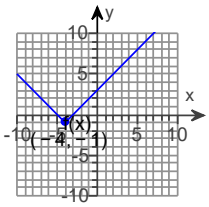
Classify the function $g(x) = 2x - 6$. Choose the correct answer below.

- [x] Polynomial function
- [ ] Root function
- [ ] Rational function

The domain of $g(x) = 2x - 6$ is $(-\infty, \infty)$.

(Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)

18. The graph to the right was created by using one horizontal shift and one vertical shift of the graph of the basic function $y = |x|$. Write a function that describes the graph to the right.



The function that describes the graph is $f(x) = |x + 4| - 1$. (Simplify your answer.)

19. Solve using the square root property.

$3x^2 = 21$

The solution is $x = \pm\sqrt{7}$.

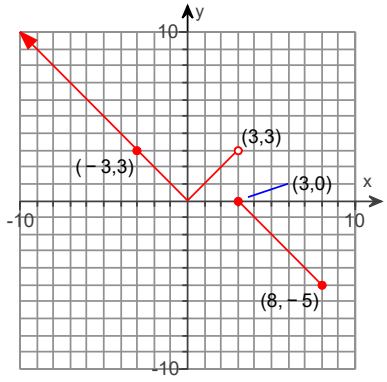
(Simplify your answer. Type an exact answer, using radicals as needed. Express complex numbers in terms of i. Use a comma to separate answers as needed.)

20. Determine whether the given equation is linear or non-linear.

$2x^2 + 8x = 4$

The equation is non-linear.

21. Find the rule that describes the piecewise-defined function.



Write the rule for the function. Select the correct choice below and fill in the answer boxes to complete your choice.
(Type an exact answer, using radicals as needed. Do not factor. Type integers or simplified fractions.)

- [ ] **A.** $f(x) = \begin{cases} \square \text{ if } x < \square \\ \square \text{ if } \square < x \le \square \end{cases}$
- [x] **B.** $f(x) = \begin{cases} |x| \text{ if } x < 3 \\ -x + 3 \text{ if } 3 \le x \le 8 \end{cases}$
- [ ] **C.** $f(x) = \begin{cases} \square \text{ if } x \le \square \\ \square \text{ if } \square \le x \le \square \end{cases}$
- [ ] **D.** $f(x) = \begin{cases} \square \text{ if } x \le \square \\ \square \text{ if } \square < x < \square \end{cases}$

22. Solve the three-part linear inequality. Express the solution in interval notation.

$3 \le -9-(a+4) \le 7$

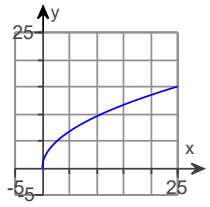
Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

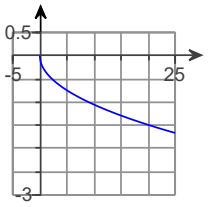
- **A.** The solution set in interval notation is $[-20, -16]$.
  (Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- **B.** The solution set is the empty set.

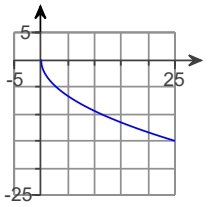
23. Use the graph of a known basic function and a vertical stretch or vertical compression to sketch the graph of $g(x)=\frac{1}{3}\sqrt{x}$.

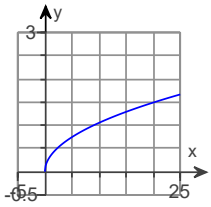
The graph of $g(x)=\frac{1}{3}\sqrt{x}$ is a vertical compression of the basic function $f(x)=\sqrt{x}$ by a factor of $\frac{1}{3}$.

Choose the correct sketch of g(x).

- **A.**


- **B.**


- **C.**


- **D.**


24. Find the function $(g \circ f)$ and simplify.

$f(x)=7x+9,\ g(x)=\frac{6}{x+9}$

$(g \circ f)(x) = \frac{6}{7x+18}$

(Simplify your answer.)

25. Determine whether the following equation is rational or non-rational.

$\frac{8}{x}=11$

The expression $\frac{8}{x}$ is a rational expression. The expression 11 is a polynomial. So, the equation is a rational equation.

26. Solve.

$-3(6-x)+8=4-5(x+2)$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution is $x=\frac{1}{2}$. (Type an integer or a simplified fraction.)
- **B.** The solution is all real numbers.
- **C.** There is no solution.

27. Solve the following absolute value equation.

$|2x-6|-5=-3$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is $\{$ 2, 4 $\}$.
  (Simplify your answer. Use a comma to separate answers as needed.)
- **B.** The solution set is the empty set, $\{\}$.

28. Solve the equation after making an appropriate substitution. Complete parts a through d.

$x^6-19x^3=216$

a) Determine the appropriate substitution using the new variable u.

$u=$ x^3

b) Write the new quadratic equation using the variable.

$u^2-19u-216=0$
(Simplify your answer. Do not factor.)

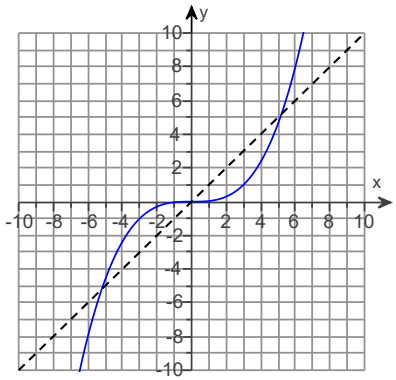
c) Solve the new equation for the variable u.

$u=$ 27, -8
(Simplify your answer. Type your answer(s) as integers or simplified fractions. Use a comma to separate answers as needed.)

d) Determine the solution to the original equation.

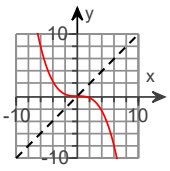
The solution set to the original equation is $\{$ 3, -2 $\}$.
(Simplify your answer. Type your answer(s) as integers or simplified fractions. Use a comma to separate answers as needed.)

29. Use the graph of f to sketch the graph of f^{-1}.

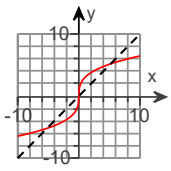


Choose the correct graph of the inverse below.

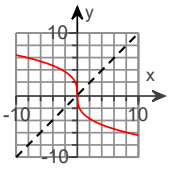
- **A.**



- **B.**



- **C.**



- **D.** The function does not have an inverse.

30. Find the equation of a line that is perpendicular to the line $x=-3$ and contains the point $(-1,0)$.

The equation of the perpendicular line is $y=0$.
(Type your answer in standard form, using integer coefficients with $A \geq 0$.)

31. Find the point-slope form of the line with the given slope which passes through the indicated point.

Slope $=-\frac{1}{3}$; Line passes through the point (8,1)

Write an equation for the line in point-slope form.

$y-1=-\frac{1}{3}(x-8)$
(Use integers or simplified fractions for any numbers in the equation.)

32. Solve the equation by using the quadratic formula. Complete parts a and b.

$2x^2 + 18x = 9$

a. Which of the following represents the substitutions made when using the quadratic formula to solve the given equation? Choose the correct answer.

- **A.** $x = \dfrac{-18 \pm \sqrt{(18)^2 - 4(2)(-9)}}{2(2)}$
- **B.** $x = \dfrac{18 \pm \sqrt{(18)^2 - 4(2)(-9)}}{2(2)}$
- **C.** $x = \dfrac{18 \pm \sqrt{(18)^2 + 4(2)(-9)}}{2(2)}$
- **D.** $x = \dfrac{-18 \pm \sqrt{(18)^2 + 4(2)(-9)}}{2(2)}$

b. Completely simplify the right side of the equation from part a to solve for x.

$x = \dfrac{-9 + 3\sqrt{11}}{2}, \dfrac{-9 - 3\sqrt{11}}{2}$

(Simplify your answer. Use a comma to separate answers as needed. Use integers or fractions for any numbers in the expression. Type an exact answer, using radicals and i as needed.)

YOU ANSWERED: $-9 \pm \dfrac{3\sqrt{11}}{2}$

33. Use the given conditions to write an equation for the line in standard form.

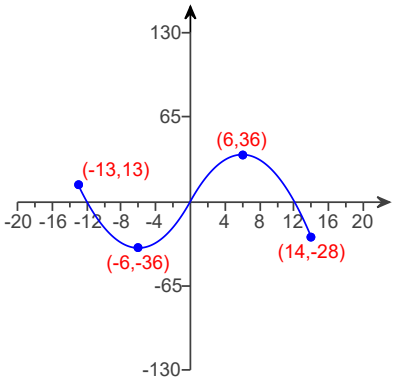
Passing through $(-8, -1)$ and perpendicular to the line whose equation is $y + 9 = \dfrac{4}{5}(x - 1)$

Write an equation for the line in standard form.

$5x + 4y = -44$

(Type your answer in standard form, using integer coefficients with $A \geq 0$.)

34. Use the graph below to find the information on the right.



a. For what value(s) of x does the function obtain a relative minimum? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The function obtains a relative minimum at -6. (Type an integer or a decimal.)
- **B.** There is no solution.

b. Find the relative minimum value. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The relative minimum value is -36. (Type an integer or a decimal.)
- **B.** There is no solution.

c. For what value(s) of x does the function obtain a relative maximum? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The function obtains a relative maximum at 6. (Type an integer or a decimal.)
- **B.** There is no solution.

d. Find the relative maximum value. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The relative maximum value is 36. (Type an integer or a decimal.)
- **B.** There is no solution.

35. The equations of two lines are given. Determine if the lines are parallel, perpendicular, or neither.

$$y = 2x - 2$$
$$6x - 4y = 2$$

Are the lines parallel, perpendicular, or neither?

- parallel
- neither
- perpendicular

36. Use the given conditions to write an equation for the line in standard form.

Passing through $(-1,2)$ and parallel to the line whose equation is $y = \frac{2}{3}x + \frac{2}{3}$

Write an equation for the line in standard form.

$2x - 3y = -8$

(Type your answer in standard form, using integer coefficients with $A \geq 0$.)

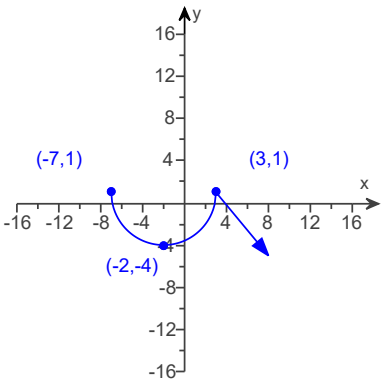
37. Find the distance d(A,B) between points A and B.

A(3,5); B(−8, −2)

$d(A,B) = \sqrt{170}$

(Simplify your answer. Type an exact answer, using radicals as needed.)

38. Use the graph to determine the domain and range of the function.



What is the domain of the function?

$[-7, \infty)$

(Type your answer in interval notation.)

What is the range of the function?

$(-\infty, 1]$

(Type your answer in interval notation.)

39. Write an equation for the inverse of the given one-to-one function.

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

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

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

YOU ANSWERED: $(4-x)^3$

40. Find the midpoint of the line segment joining points A and B.

$A(0,6); B\left(-3, \frac{2}{3}\right)$

The midpoint is $\left(-\frac{3}{2}, \frac{10}{3}\right)$. (Type an ordered pair. Simplify your answer.)

41. Solve the following equation by factoring.

$4x^2 - 21x - 49 = 0$

The solution is $\left\{-\frac{7}{4}, 7\right\}$.

(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

42. Find the equation of the line passing through the points $(-1,1)$ and $(5,-8)$. Write the equation in slope-intercept form.

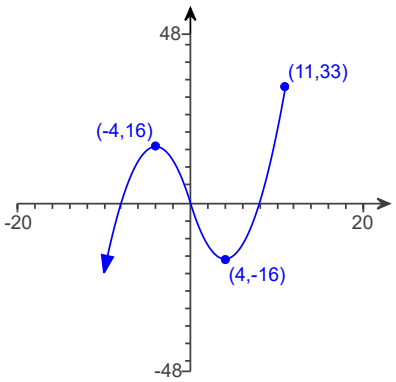
Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The equation of the line in slope-intercept form is $y = -\frac{3}{2}x - \frac{1}{2}$.

  (Type your answer in slope-intercept form. Use integers or simplified fractions for any numbers in the equation.)
- **B.** The slope is undefined.

YOU ANSWERED: A.: $y = -\frac{3}{2}x + \frac{1}{2}$

43. Determine the interval(s) for which the function is (a) increasing, (b) decreasing, and (c) constant.



(a) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The function is increasing on the interval(s) $(-\infty,-4),(4,11)$.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** There is no solution.

(b) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The function is decreasing on the interval(s) $(-4,4)$.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** There is no solution.

(c) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The function is constant on the interval(s) ____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** There is no solution.

YOU ANSWERED: A.: $(-\infty, 4), (4, 11)$

---

44. Solve the radical equation.

$$x-2=\sqrt{5x+4}$$

The solution set is $\{9\}$.
(Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

---

45. Given the equation of a line in standard form, determine the slope, m, the y-intercept, b, and sketch the line. Complete parts a and b.

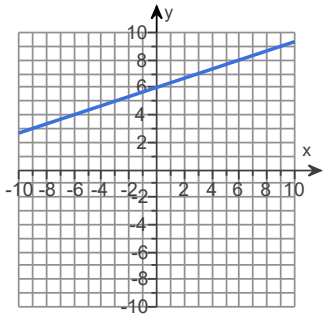
$$x-3y=-18$$

a) Determine the slope and y-intercept of the line. Select the correct choice and, if necessary, fill in the answer box(es) to complete your choice.

(Type an integer or a simplified fraction.)

- **A.** m = $\frac{1}{3}$, b = 6
- **B.** m = ____, the y-intercept does not exist
- **C.** The slope does not exist, b = ____.
- **D.** The slope and y-intercept do not exist.

b) Use the slope and the y-intercept to sketch the graph of the line. Use the graphing tool to graph the line.



46. Find the x- and y- intercepts of the graph of the given equation.

$y = 2x - 3$

Find the x-intercept(s). Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The x-intercept(s) is/are $x =$ $\frac{3}{2}$.
(Simplify your answer. Use integers or fractions for any numbers in the expression. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

B. There are no x-intercepts.

Find the y-intercept(s). Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

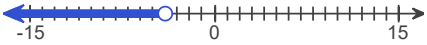
A. The y-intercept(s) is/are $y =$ -3.
(Simplify your answer. Use integers or fractions for any numbers in the expression. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

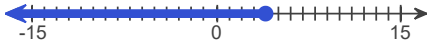
B. There are no y-intercepts.

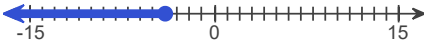
47. Solve the linear inequality. Then, a. graph the solution on a number line, b. write the solution in set-builder notation, and c. write the solution in interval notation.

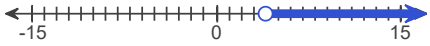
$5(t-2) - 7t \geq t + 2$

a. Choose the correct graph.

A.


B.


C.


D.


b. Select the correct choice and, if necessary, fill in the answer box(es) to complete your choice.

A. The solution is $\{t \mid t \leq -4\}$.
(Simplify your answer. Use integers or fractions for any numbers in the inequality.)

B. The solution is $\{t \mid \quad \leq t \leq \quad\}$.
(Simplify your answers. Use integers or fractions for any numbers in the inequality.)

C. The solution is $\{t \mid t \geq \quad\}$.
(Simplify your answer. Use integers or fractions for any numbers in the inequality.)

D. The solution is the empty set.

c. Select the correct choice and, if necessary, fill in the answer box to complete your choice.

A. The solution is $(-\infty, -4]$.
(Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)

B. The solution is the empty set.

48. Complete the following for the piecewise-defined function $f(x) = \begin{cases} 3x-1 & \text{if } -2 \le x < 2 \\ -2x+7 & \text{if } 2 \le x \le 4 \end{cases}$.

a. Find f(−2), f(0), and f(2).
b. Sketch the graph of y = f(x).
c. Find the domain of f.
d. Find the range of f.

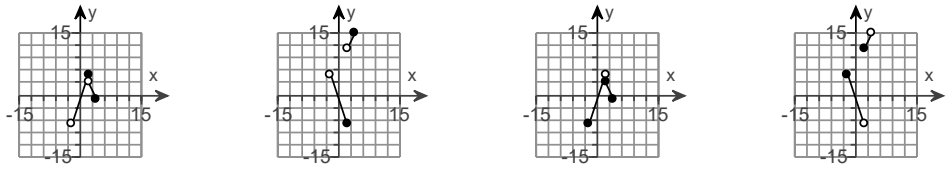
a. f(−2) = −7 (Simplify your answer.)

f(0) = −1 (Simplify your answer.)

f(2) = 3 (Simplify your answer.)

b. Choose the correct graph of y = f(x).

A. **B.** **C.** **D.**



c. What is the domain of the function?

The domain of f is [−2,4].
(Type your answer in interval notation.)

d. What is the range of the function?

The range of f is [−7,5).
(Type your answer in interval notation.)

YOU ANSWERED: 5

[−2, 2)∪[2, 4]

49. Find the slope-intercept form of the line with the given slope and y-intercept.

Slope = 4; y-intercept = −7

What is the equation of the line?

y = 4x − 7
(Simplify your answer. Type your answer in slope-intercept form. Use integers or fractions for any numbers in the equation.)