1. Which family of function does each graph belong?

- E. Exponential
- B. Quadratic
- C. Cubic
- E. Inverse/Rational
- A. Linear
- C. Cubic
- B. Quadratic
- D. Absolute Value

A. Linear  
B. Quadratic  
C. Cubic  
D. Absolute Value  
E. Exponential  
F. Inverse  
G. Square Root

2. The coach of a basketball team gathered data on each player’s height, in inches, and shoe size. He organized the data using ordered pairs in the form (Height, Shoe Size). The set of ordered pairs below shows this relation.

\{(72, 12), (75, 12 \frac{1}{2}), (70, 12), (73, 11 \frac{1}{2}), (75, 13)\}

Is this relation a function? Explain your reasoning in terms of the definition of a function.

No, the input of 75 is mapped to two different range values (12 \frac{1}{2}, 13)
3. Which of the following represents a function? Which is not a function? Explain your reasoning:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
</tr>
</tbody>
</table>

No. The input (domain) 6 is mapped to two outputs (ranges) 13 and 25.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
</tr>
</tbody>
</table>

Yes. Each input has a unique output.

4. a. A store bought a case of disposable cameras for $300. The store's profit on the cameras is a function of the number of cameras sold. Find the range of the function $p = 6c - 300$ when the domain is {0, 15, 50, 62}.

\[ p = 6(0) - 300 = -300 \]
\[ p = 6(15) - 300 = 0 \]
\[ p = 6(50) - 300 = 30 \]
\[ p = 6(62) - 300 = 72 \]

\( \{ -300, -210, 0, 72 \} \)

b. In this situation, what do the domain and range represent?

Domain: number of cameras sold

Range: profit

5. An economist predicts the relationship between the price of music CDs ($p$) and the number of CDs a customer is willing to buy ($n$) with this function.

\[ p = -2n + 30 \]

According to this model, how many CDs is a customer willing to buy when the price is $20?

\[
\begin{align*}
20 &= -2n + 30 \\
-30 &= -30 \\
-10 &= -2n \\
5 &= n
\end{align*}
\]
6. State the x- and y-intercepts for the following function.

\[ 3y - x = 15 \]

\[ 3(0) - x = 15 \]
\[ -x = 15 \]
\[ x = -15 \]
\[ (-15, 0) \]

\[ 3y - 0 = 15 \]
\[ 3y = 15 \]
\[ y = 5 \]
\[ (10, 5) \]

7. State the domain and range of the following graph.

Domain
\[-4 \leq x \leq 0 \]
\[ [-4, 0] \]

Range
\[-2 \leq y \leq 6 \]
\[ [-2, 6] \]

8. The table below shows the change in temperature over 12 hours.

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>13°</td>
</tr>
<tr>
<td>4</td>
<td>5°</td>
</tr>
<tr>
<td>8</td>
<td>-3°</td>
</tr>
<tr>
<td>12</td>
<td>-11°</td>
</tr>
</tbody>
</table>

What is the rate of change per hour?

rate of change = \( \frac{\Delta y}{\Delta x} = \frac{-8}{4} = -2 \)  
\[-2^\circ/\text{hour} \]
9  At the Hamilton Doll Company, the cost of producing each Baby Anna doll is $12 plus $8 for clothes. The doll sells for $28, so the company uses the following profit function:

\[ P(x) = 28x - (12 + 8)x \]

Where \( x \) represents the number of dolls sold. If the company decides to increase the doll's selling price to $32, what will be the increase in profit per doll?

\[ P(x) = 28x - 20x = 8x \quad \$8/doll \]

\[ \text{new } P(x) = 32x - 20x = 12x \quad \$12/doll \]

\[ \text{increase } = \$4/doll \]

UNIT 2

10  An economist predicts the relationship between the price of music CDs (\( p \)) and the number of CDs a customer is willing to buy (\( n \)) with this function.

\[ p = -2n + 30 \]

According to this model, how many CDs is a customer willing to buy when the price is $20?

\[ 20 = -2n + 30 \]

\[ -30 \]

\[ -10 = -2n \]

\[ n = 5 \]
11 The number of cycle handlebars produced by two machines at a manufacturing plant is shown in the graph below.

If both machines are operating at the same time, how many hours will it take them to produce 700 handlebars?

\[
25x + 15x = 700 \\
40x = 700 \\
\frac{40}{40} \\
x = 17.5 \text{ hours}
\]

12 State the domain and range of \( y = 2^x \).

Domain: \( \mathbb{R} \), \(-\infty < x < \infty \) \((-\infty, \infty)\)

Range: \( 0 < y < \infty \) \((0, \infty)\) \(\text{can't equal 0! asymptote!}\)

13 You have a cell phone plan that costs $50.00 per month, and it includes 100 text messages. Use the table below to calculate the cost for each additional text message after the first 100 messages.

<table>
<thead>
<tr>
<th>Number of texts</th>
<th>0</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>200</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total bill</td>
<td>$50</td>
<td>$50</td>
<td>$53.75</td>
<td>$57.50</td>
<td>$65</td>
<td>$110</td>
</tr>
</tbody>
</table>

\[
\frac{53.75 - 50}{125 - 100} = \frac{3.75}{25} = \$0.15/\text{text}
\]
14 Shannon measures the height of a bamboo plant that grows at a constant rate. She records the height daily and records her measurements in the table below:

<table>
<thead>
<tr>
<th>Day</th>
<th>Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.9</td>
</tr>
<tr>
<td>13</td>
<td>1.05</td>
</tr>
<tr>
<td>14</td>
<td>1.20</td>
</tr>
<tr>
<td>15</td>
<td>1.35</td>
</tr>
<tr>
<td>16</td>
<td>1.5</td>
</tr>
<tr>
<td>17</td>
<td>1.65</td>
</tr>
<tr>
<td>18</td>
<td>1.8</td>
</tr>
<tr>
<td>19</td>
<td>1.95</td>
</tr>
<tr>
<td>20</td>
<td>2.1</td>
</tr>
</tbody>
</table>

On which day will the plant's height be double what its height was on Day 12?

\[ .9(2) = 1.8 \]

\[ \text{day 18} \]

15 The sign below shows the costs for one ice cream sundae with toppings.

<table>
<thead>
<tr>
<th>Number of Toppings</th>
<th>Cost (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$2.75</td>
</tr>
<tr>
<td>1</td>
<td>$3.25</td>
</tr>
<tr>
<td>2</td>
<td>$3.75</td>
</tr>
<tr>
<td>3</td>
<td>$4.25</td>
</tr>
<tr>
<td>4</td>
<td>$4.75</td>
</tr>
</tbody>
</table>

\[ 3.75 - 3.25 = .50 \]

\[ $.50/\text{topping} \]

Which line shown corresponds to the ordered pairs \((x,y)\) ?

A \[ c = 2.75t + 0.5 \]

B \[ c = 0.5t + 2.75 \]

C \[ c = 3.25t + 0.5 \]

D \[ c = 0.5t + 3.25 \]
UNIT 3

16  The width of a rectangular map is 12 inches more than the length and the perimeter is 60 inches. Find the length and the width.

\[ l = x \]
\[ w = x + 12 \]

\[ 2(l) + 2(w) = 60 \]
\[ 2x + 2(x + 12) = 60 \]
\[ 2x + 2x + 24 = 60 \]
\[ 4x + 24 = 60 \]
\[ 4x = 36 \]
\[ x = 9 \]

\[ l = 9 \text{ in} \]
\[ w = 9 + 12 = 21 \text{ in} \]

17  A quadrilateral has a second side 3 more than the first side. The third side is 2 less than twice the first side and the fourth side is 6 more than the first side. The perimeter is 262 meters. Find the length of all four sides.

\[ \text{Side 1} = x \]
\[ \text{Side 2} = x + 3 \]
\[ \text{Side 3} = 2x - 2 \]
\[ \text{Side 4} = x + 6 \]

\[ 5 \text{Side 1} + \text{Side 2} + \text{Side 3} + \text{Side 4} = 262 \]
\[ 5x + (x + 3) + (2x - 2) + (x + 6) = 262 \]
\[ 5x + 7 = 262 \]
\[ 5x = 255 \]
\[ x = 51 \]

18  Larry runs at an average a rate of 8 miles per hour. He walks at an average rate of 3 miles per hour.

a. Let \( x \) = time running and \( y \) = time walking. Write an equation in standard form to relate the times he spends running and walking if he travels a distance of 15 miles.

\[ 8x + 3y = 15 \]

b. Graph the equation

[Graph of a line with points labeled (0, 5) and (1.875, 0)]
19  Suppose you have a job in an ice cream shop that pays $6 per hour. You also have a babysitting job that pays $4 per hour. You want to earn at least $60 per week but would like to work no more than 12 hours per week. Write a system to model this situation.

\[ \text{icecream} = x \quad \text{babysit} = y \]

\[ 6x + 4y \geq 60 \]

\[ x + y \leq 12 \]

20  A generic linear function written in standard form is shown below. Rewrite the equation solved for \( x \).

\[ Ax + By = C \]

\[ \frac{Ax}{A} = \frac{C - By}{A} \]

\[ x = \frac{C - By}{A} \]

21  Circle which step(s) contain an error based on the previous step.

\[ \frac{1}{3}(x - 9) = -6 \]

\[ \frac{1}{3}x - 9 = -6 \]

\[ \frac{1}{3}x = -6 + 9 \]

\[ \frac{1}{3}x = 3 \]

\[ x = 3 \div 3 \]

\[ x = 1 \]

\[ \frac{1}{3}(x - 9) = -6 \]

\[ \frac{1}{3}x - 3 = -6 \]

\[ \frac{1}{3}x = -3 \]

\[ x = -9 \]

What is the correct solution?
22 What property is used in steps 1, 2, and 4?

Equation: \( \frac{2}{3}(x - 6) = 5 \)

Step 1: \( \frac{2}{3} x - 4 = 5 \) \text{ Distributive property }

Step 2: \( \frac{2}{3} x - 4 + 4 = 5 + 4 \) \text{ addition prop. equality }

Step 3: \( \frac{2}{3} x = 9 \)

Step 4: \( \frac{3}{2} \cdot \frac{2}{3} x = 9 \cdot \frac{3}{2} \) \text{ multiplication prop. equality }

Step 5: \( x = \frac{27}{2} \)

23 Find the solutions for the following inequality. Graph the solution.

\[ 4 - 6x \geq -32 \]

\[ \begin{align*}
-4 - 6x & \geq -32 \\
-6x & \geq -36 \\
\frac{-6x}{-6} & \leq \frac{-36}{-6} \\
x & \leq 6
\end{align*} \]

Solution \( x \leq 6 \)

24 Determine whether the following equations are parallel, perpendicular, or neither to the following equation.

a. \( y = -\frac{2}{3} x + 5 \) \text{ parallel} \[ 2x + 3y = 8 \]

\[ \begin{align*}
2x & = -3y + 8 \\
\frac{2x}{3} & = \frac{-3y + 8}{3} \\
y & = -\frac{2}{3}x + \frac{8}{3}
\end{align*} \]

\[ m = -\frac{2}{3} \]

b. \(-3x + 2y = 14\) \text{ perpendicular} \[ 6x + 4y = 20 \]

c. \( 6x + 4y = 20 \) \text{ Neither} \[ y - 5 = \frac{3}{2}(x + 4) \]

d. \( y - 5 = \frac{3}{2}(x + 4) \) \text{ perpendicular} \[ 4x - 6y = 24 \]

e. \( 4x - 6y = 24 \) \text{ neither} \[ y + 3 = -\frac{2}{3}(x - 7) \]

\[ \begin{align*}
4x - 16y & = 24 \\
-4x & = -16y \\
\frac{-4x}{-16} & \cdot \frac{-16y}{-16} \\
y & = \frac{2}{3}x - 4
\end{align*} \]

\[ \begin{align*}
2y & = 3x + 14 \\
\frac{2y}{2} & = \frac{3x + 14}{2} \\
\frac{4y}{4} & = \frac{3x + 14}{4} \\
y & = \frac{3}{2}x + 7 \\
y & = -\frac{3}{2}x + 5
\end{align*} \]
25 When you exercise, your pulse rate rises. Recommended pulse rates vary with age and physical condition. For vigorous exercise, such as jogging, the inequality
\[ 0.7 \leq \frac{R}{(220 - a)} \leq 0.85 \]
gives a target range for pulse rate R (in beats per minute), based on age a (in years).

a. What is the target range for pulse rates for a person 35 years old? Round to the nearest whole number and write your answer as a compound inequality.

\[ 0.7 \leq \frac{R}{220-35} \leq 0.85 \]

\[ \left[ 0.7 \leq \frac{R}{185} \leq 0.85 \right] \]

\[ 129.5 \leq R \leq 157.25 \]

b. Your cousin’s target pulse rate is in the range between 140 and 170 beats per minute. What is your cousin’s age?

\[ \frac{(220-a) \cdot 0.7}{220-a} \leq 140 \]

\[ \frac{154 - 0.7a}{220-a} \leq 140 \]

\[ -14 \leq -0.7a \]

\[ a \geq 20 \]

\[ 170 \leq \frac{0.85(220-a)}{220-a} \]

\[ \frac{170}{220-a} \leq 0.85 \]

\[ -20 \leq a \]

\[ a \leq 20 \]

26 Two systems of linear equations are shown below.

\[ \left\{ \begin{array}{c}
 \frac{x}{2} - \frac{y}{3} = 1 \\
-3x + y = 12
\end{array} \right. \implies 3x - 2y = 6 \]

Which of these represents a step in using elimination to create an equivalent system of equations with the same solutions?

A  \[ \begin{align*}
3x - 2y &= 6 \\
(3x + y &= 12) \\
y &= 18
\end{align*} \]

B  \[ \begin{align*}
3x - 2y &= 6 \\
-(3x - y &= -12) \\
y &= 18
\end{align*} \]

C  \[ \begin{align*}
3x - 2y &= 6 \\
(3x - y &= 12) \\
-3y &= 18
\end{align*} \]

D  \[ \begin{align*}
3x - 2y &= 6 \\
-(3x + y &= -12) \\
-y &= -6
\end{align*} \]
27  How many solutions does the following system of linear equations have?

\[
\begin{align*}
5x + 2y &= 16 \quad &-2 \\
10x + 4y &= 12 \\
\hline
10x + 4y &= -32 \\
0x + 0y &= -20 \\
\end{align*}
\]

no solutions

28  Solve the system of equations.

\[
\begin{align*}
2x + 9y &= -1 \\
-x + 9y &= 14 \quad &2 \\
\hline
2x + 0u &= -1 \\
2x &= -10 \\
\end{align*}
\]

\[
\begin{align*}
x &= -5 \\
2y &= -7 \\
y &= 1 \\
\end{align*}
\]

29  Name 5 ordered pairs that satisfy the equation \( y = \frac{3}{4}x - 9 \).

Choose any 5 x-values

\[
\begin{array}{c}
(-4, -12) \\
(0, -9) \\
(1, -8) \\
(2, 1) \\
(3, 2) \\
\end{array}
\]

\[
\begin{align*}
y &= \frac{3}{4}(4) - 9 = -6 \\
y &= \frac{3}{4}(0) - 9 = -9 \\
y &= \frac{3}{4}(1) - 9 = -\frac{27}{4} \\
y &= \frac{3}{4}(2) - 9 = -\frac{21}{4} \\
\end{align*}
\]

30  Two groups of students order burritos and tacos at a local restaurant. One order of 3 burritos and 4 tacos costs $11.33. The other order of 9 burritos and 5 tacos costs $23.56.

a. Write a system of equations that describes this situation.

\[
\begin{align*}
3b + 4t &= 11.33 \\
9b + 5t &= 23.56 \\
\end{align*}
\]

b. Solve by elimination to find the cost of a burrito and the cost of a taco.

\[
\begin{align*}
(3b + 4t = 11.33) - 3 \\
3b + 4t &= 11.33 \\
3b + 5.96 &= 11.33 \\
-5.96 &= -5.96 \\
\hline
3b &= 5.37 \\
b &= \$1.79
\end{align*}
\]

\[
\begin{align*}
-9b - 12t &= -33.99 \\
9b + 5t &= 23.56 \\
\hline
-7t &= -10.43 \\
t &= \$1.49
\end{align*}
\]
31 Graph the inequality: \( 2y < x + 2 \)
\[
\frac{y}{2} < \frac{x}{2} + 1
\]
\( m = \frac{1}{2}, b = 1 \) dashed shade below

32 The Incredibles are on vacation in Virginia Beach which is 724 miles away from their home in Detroit. When they return home, they are traveling at an average speed of 60 mph. What is the x-intercept, y-intercept and what do each represent.

\[
y = -60x + 724
\]
\( c = -60(0) + 724 \)
\( -724 = -60x \) \( x = \frac{724}{60} \approx 12.0666 \) \( x = 12\) \( h\) \( 4\) \( \text{min} \)

33 Graph the following equations.
\[
y = |x - 1| - 2
\]
right 1 down 2

34 Which equation has a y-intercept at 5 and is perpendicular to the line passing through the points \((-1, -5)\) and \((4, 3)\)?

\[
m = \frac{3 - (-5)}{4 - (-1)} = \frac{8}{5} \quad m = \frac{8}{5} \quad \text{perpendicular:} \quad m = \frac{-5}{8}
\]

\[
y = -\frac{5}{8}x + 5
\]
35 Determine if the following lines are parallel, perpendicular, or neither.

\[ 5x + 2y = 18 \]
\[ -4y = 10x - 20 \]
\[ y = -\frac{5}{2}x + 5 \]

\[ \frac{5x}{-5} + \frac{2y}{-5} = \frac{18}{-5} \]
\[ \frac{-4y}{-4} = \frac{10x - 20}{-4} \]
\[ y = \frac{-\frac{5}{2}x + 5}{2} \]

parallel-same slope \( (-\frac{5}{2}) \)
different y-int.

36 Jennifer wrote this equation to model how she expects the price, \( p \), of a stock will change:

\[ p = -0.25w + 15 \]

A As \( w \) increases, the value of \( p \) increases
B As \( w \) increases, the value of \( p \) decreases

C As \( w \) increases, the value of \( p \) stays the same
D As \( w \) increases, the value of \( p \) increases on some days

UNIT 4

37 Name the coefficients and constants for the following expressions

a) \[ 8x^7 - 14x^5 + 34x^3 - x^2 + 54 \]
Coefficients: \( 8, -14, 34, -1 \)
Constants: \( 54 \)

b) \[ 5x^2 \]
Coefficients: \( 5 \)
Constants: \( 0 \)

38 The expression \( (x^3y^2)^{-3} \) can be simplified as?

\[ x^{-9}y^{-6} = \frac{1}{x^9y^6} \]
39  Simplify the following expression.
\[
\frac{E \cdot 32^5}{E \cdot 32^{2.7}}
\]

Extra:

40  Solve for \( x \):
\[
6 \left[ 4 = \frac{1}{2}x + \frac{2}{3} \right]
\]
\[
\frac{24 = 3x + 4}{-4} = \frac{20 = 3x}{3}
\]
\[
x = \frac{20}{3}
\]

41  Solve for \( x \):
\[
\frac{20}{5} = \frac{3}{4}x + \frac{8}{5}
\]
\[
8 = 15x + 32
\]
\[
\frac{-32}{-32} = \frac{15x}{15}
\]
\[
x = -\frac{8}{5}
\]

42  Your family is driving on I-80 through Nebraska. You will be staying in a great motel with a pool that has a slide when you arrive in Cheyenne, Wyoming. You have just left Lincoln, Nebraska which is 420 miles from the motel in Cheyenne, Wyoming. You are traveling at an average speed of 70 miles per hour.
A. Write an equation that models your distance as you travel TO the hotel.
B. What is the y-intercept? What does it mean in terms of the problem?
C. What is the x-intercept? What does it mean in terms of the problem?

A) \( y = -70x + 420 \)
B) 420 - you start 420 miles from the pool
C) 0 = -70x + 420
\[
\frac{-420}{-420} = \frac{-420}{-70x}
\]
\[
x = 6
\]

C) it takes 6 hours to get to the pool.
43 Create a code that will generate a solid red rectangle that is 175 pixels wide and 100 pixels tall.

```
rectangle (width, height, style, color)
  175 100 Solid Red
```

44 Create a set of evaluation blocks to model the expression:
\[(6 \times 3) \div (12 - 9)\]

```
\[\frac{6 \times 3}{12 - 9}\]
```

45 Write a code that will generate the outline of a yellow triangle that is 300 pixels.

```
triangle (size, style, color)
  300 Outline Yellow
```

46 Several students decide to start a T-shirt company. After initial expenses of $280, they purchase each T-shirt wholesale for $3.99. They sell each T-shirt for $10.99. How many must they sell to break even?

\[
egin{align*}
R(x) &= 10.99x \\
C(x) &= 3.99x + 280 \\
10.99x &= 3.99x + 280 \\
6x &= 280 \\
x &= 40
\end{align*}
\]
Two bicyclists ride in opposite directions. The speed of the first bicyclist is 5 miles per hour faster than the second. After 2 hours they are 70 miles apart. Find their rates.

Bike 1 = 20
Bike 2 = 15

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>T</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike 1</td>
<td>x+5</td>
<td>2</td>
<td>2(x+5)</td>
</tr>
<tr>
<td>Bike 2</td>
<td>x</td>
<td>2</td>
<td>2x</td>
</tr>
</tbody>
</table>

$$2(x+5)+2x=70$$
$$2x+10+2x=70$$
$$4x+10=70$$
$$-10-10$$
$$4x=60$$
$$x=15$$

Solve: $$4|x+5| > 8$$

$$\frac{x+5}{4} > \frac{8}{4}$$

$$|x+5| > 2$$

$$x+5 > 2$$

$$-5$$

$$x > -3$$

$$x+5 < -2$$

$$-5$$

$$x < -7$$

X < -7 or X > -3 (disjunction)

Solve: $$4|x+1| = 16$$

$$\frac{x+1}{4} = \frac{16}{4}$$

$$x+1 = 4$$

$$-1$$

$$x = 3$$

$$x+1 = -4$$

$$-1$$

$$x = -5$$

$$x = \{-5, 3\}$$

Solve: $$-3|x-3| = 9$$

$$\frac{|x-3|}{-3} = \frac{-9}{-3}$$

$$|x-3| = -3$$

No solution

The following ordered pairs represent a direct variation, find the missing value. (-6, 24) (5, y)

$$y = kx$$ or $$k = \frac{y}{x}$$

$$\frac{24}{-6} = \frac{y}{5}$$

$$-6y = 120$$

$$y = -20$$
The following values represent an inverse variation. Determine the constant and write the inverse variation equation.

<table>
<thead>
<tr>
<th>$X$</th>
<th>-3</th>
<th>-1</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y$</td>
<td>-6</td>
<td>-18</td>
<td>18</td>
<td>6</td>
</tr>
</tbody>
</table>

$$xy = k \quad y = \frac{k}{x}$$

$$-3(-6) = 18 \quad -(18) = 18 \quad 1(18) = 18 \quad 3(6) = 18$$

$k = 18 \quad y = \frac{18}{x}$

Consider $f(x) = |x + 3| - 4$. State the max or min point and the domain and range.

$(-3,-4)$ min

domain $\mathbb{R}$ range $-4 \leq y < \infty$

Write $y - 3 = \frac{3}{4}(x + 8)$ in both standard form and slope intercept form.

$$y - 3 = \frac{3}{4}x + 9$$

$$4 \left[ y = \frac{3}{4}x + 9 \right]$$

$$4y = 3x + 36 \quad -3x + 4y = 36$$

$$8x - 4y = -36$$

Solve the system:

$$\begin{cases} f(x) = |x + 2| \\ g(x) = \frac{1}{2}x + 4 \end{cases}$$

Identify if either solution is extraneous.

$$|x + 2| = \frac{1}{2}x + 4$$

$$x + 2 = \frac{1}{2}x + 4$$

$$-\frac{1}{2}x \quad -\frac{1}{2}x$$

$$\frac{1}{2}x + 2 = 4$$

$$-2 \quad -2$$

$$\frac{1}{2}x = 2 \quad x = 4$$

$$x + 2 = -\left(\frac{1}{2}x + 4\right)$$

$$+\frac{1}{2}x \quad +\frac{1}{2}x$$

$$\frac{3}{2}x + 2 = -4$$

$$-2 \quad -2$$

$$\frac{3}{2}x = -6 \quad x = -4$$

$$f(x) = 1 + 4 - 2 = 2$$

$$g(x) = \frac{1}{2}(-4) + 4 = 2$$

$$(-4,2)$$