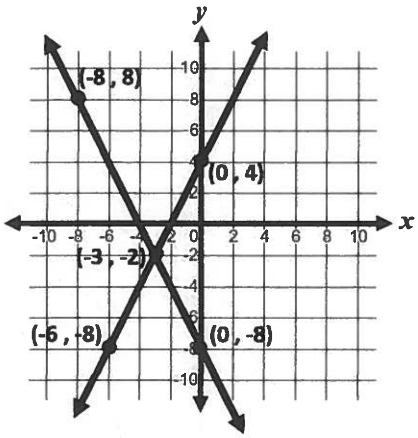
Visual Guided Practice Name: Key

Learning Target: I will solve systems of linear equations. **Form A**

1. We Do Together

Line 1: $y = 2x + 4$ and **Line 2:** $y = -2x - 8$

1a. Which ordered pair (x, y) is a solution to both lines?



$x =$ $\boxed{-3}$

$y =$ $\boxed{-2}$

Solution to the system of equations

(-3 , -2)

1b. *Notice:* $2x + 4$ *and* $-2x - 8$ *are both equal to* y. *They can be* ***substituted*** *to create a new equation.* Solve to find x, then use the value of x to find y.

$2x + 4 = -2x - 8$

$2x + 4 = -2x + \boxed{-8}$

$\boxed{+2x}$ $\boxed{+2x}$

$4x + 4 = -8$

$\boxed{-4}$ $\boxed{-4}$

$4x = -12$

$\frac{}{\boxed{4}}$ $\frac{}{\boxed{4}}$

$x = \boxed{-3}$

Since $x = \boxed{-3}$, then

$y = 2 \cdot \boxed{-3} + 4$

$y = \boxed{-6} + 4$

$y = \boxed{-2}$

Solution = (-3 , -2)

Same answer from graph!

1c. *Notice: The coefficients of* x *are opposite values. The equations can be added to* ***eliminate*** *the* x *variable and create a new equation.* Solve to find y, then use the value of y to find x.

$y = 2x + 4$

$+ (y = -2x + -8)$

$\boxed{2y} = 0 + \boxed{-4}$

$\frac{}{\boxed{2}}$ $\frac{}{\boxed{2}}$

$y = \boxed{-2}$

Since $y = \boxed{-2}$, then

$\boxed{-2} = 2x + 4$

$\boxed{-4}$ $\boxed{-4}$

$-6 = 2x$

$\frac{}{\boxed{2}}$ $\frac{}{\boxed{2}}$

$\boxed{-3} = x$

Note: The value of y can be substituted into either equation.

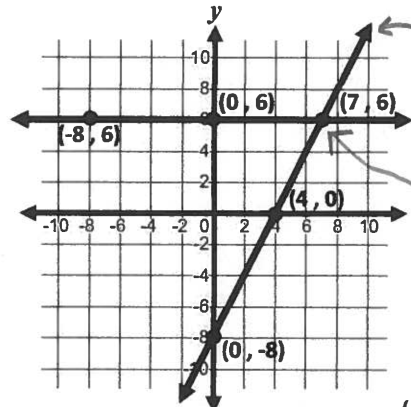
Solution = (-3 , -2)

2. Reflect: What questions do you have?

3-5. You Do Together

3. Use the graph to find the solution to the two lines.

Line 1: $y = 2x - 8$ and Line 2: $y = 6$



Solution = (7 , 6)

4. Use substitution to find the solution to the two lines.

$y = -5x - 18$ and $y = -2x - 6$

$-5x + -18 = -2x + -6$

$+5x$ $+5x$

$-18 = 3x + -6$

$+6$ $+6$

$\frac{-12}{3} = \frac{3x}{3}$

$x = -4$

$y = -2x - 6$

$= -2(-4) - 6$

$= 8 - 6$

$= 2$

Solution = (-4 , 2)

5. Use elimination to find the solution to the two lines.

$-15x - \cancel{3y} = 6$

$4x + \cancel{3y} = 5$

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

$x = -1$

$4x + 3y = 5$

$4(-1) + 3y = 5$

$-4 + 3y = 5$

$+4$ $+4$

$\frac{3y}{3} = \frac{9}{3}$

$y = 3$

Solution = (-1 , 3)

Visual Guided Practice

Name: Key

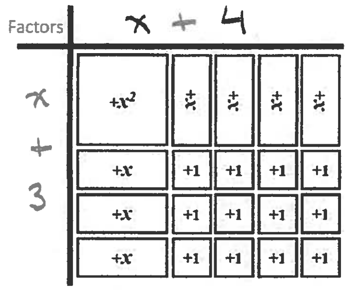
Form A

Learning Target: I will factor quadratic expressions to reveal the zeros of a function.

Note: *All quadratic expressions and functions assessed with Delta Math have 1 as the leading coefficient.*

1. We Do Together/Reflect

a. The factored form of the **expression,** $x^2 + 7x + 12$, is represented as a rectangle using algebra tiles. Label the factors of the array.

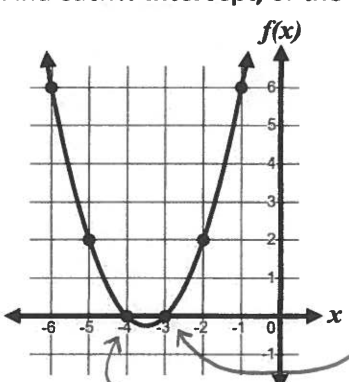


b. Find the value of x when each **factor** is equal to zero. *These values are called the* ***zeros*** *of the function.*

$x + 3 = 0$
$\boxed{-3}$ $\boxed{-3}$
$x = \boxed{-3}$

$x + 4 = 0$
$\boxed{-4}$ $\boxed{-4}$
$x = \boxed{-4}$

c. The function, $f(x) = x^2 + 7x + 12$, is graphed below. Find each ***x*-intercept,** or the **zeros** of the function.



$(\boxed{-4}, \boxed{0})$ and $(\boxed{-3}, \boxed{0})$

d. $x^2 + 7x + 12$ can be factored to find **zeros** of the function without using a graph or tiles.

- List each factor pair of the 3rd term. (12) → Factors of 12
- Find the factors with a **sum** equal to the coefficient of the 2nd term. (7)
- Substitute to write the **algebraic factors.**

1 • 12
2 • 6
3 • 4

$$x^2 + 7x + 12 = (x + \boxed{3})(x + \boxed{4})$$

- Solve to find each **zero** of the function.

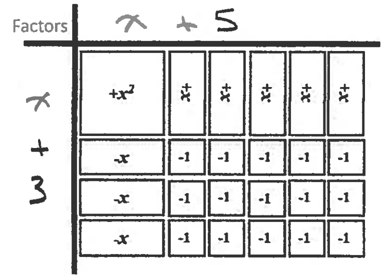
$x + 3 = \boxed{0}$
$\boxed{-3}$ $\boxed{-3}$
$x = \boxed{-3}$

and

$x + 4 = \boxed{0}$
$\boxed{-4}$ $\boxed{-4}$
$x = \boxed{-4}$

2-4. You Do Together

2. Use the array below to find the algebraic factors and zeros of the expression $x^2 + 2x - 15$.



Factors:

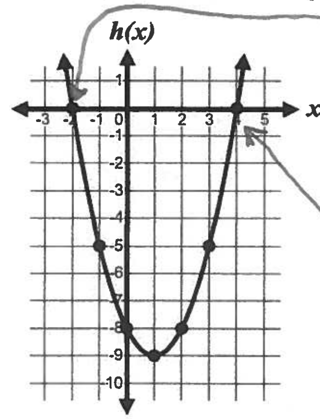
$(x + \boxed{5})$ and $(x + \boxed{3})$

$x + \boxed{5} = 0$
-5 -5

$x + \boxed{3} = 0$
-3 -3

Zeros: $x = \boxed{-5}$ and $x = \boxed{-3}$

3. Find the zeros of the function $h(x) = x^2 - 2x - 8$ that is represented in the graph below.



Zeros of $h(x)$:

$x = \boxed{-2}$ and $x = \boxed{4}$

4. Factor the expression to find the zeros of the function $k(x) = x^2 - 3x - 10$.

- Find the factors of $\boxed{-10}$ whose sum is $\boxed{-3}$.

1 • -10
2 • -5
5 • -2
10 • -1

- Find the zeros of the function k(x).

$x + \boxed{2} = \boxed{0}$
-2 -2
$x = -2$

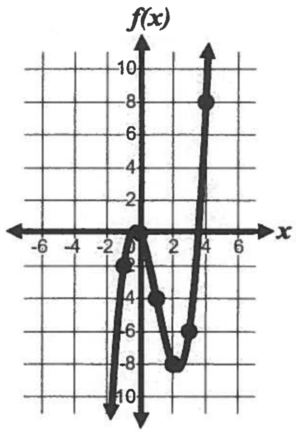
$x + \boxed{-5} = \boxed{0}$
$+5$ $+5$
$x = 5$

Zeros of $k(x)$: $x = \boxed{-2}$ and $x = \boxed{5}$

Visual Guided Practice Name: Key

Learning Target: I will evaluate linear and non-linear functions. **Form A**

1. We Do Together



Use the graph to find $f(x)$ for each value of x.

a. When $x = 2$, $f(x) = \boxed{-8}$

b. When $x = 0$, $f(x) = \boxed{0}$

c. When $x = -1$, $f(x) = \boxed{-2}$

The graph to the left represents the function $f(x)$, where $f(x) = x^3 - 3x^2 - 2x$.

d. Find the value of $f(x)$ when $x = -2$.

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

$f(-2) = \boxed{(-2)}^3 + -3 \bullet \boxed{(-2)}^2 + -2 \bullet \boxed{(-2)}$

$= \boxed{-8} + -3 \bullet \boxed{4} + \boxed{4}$

$= \boxed{-8} + \boxed{-12} + \boxed{4}$

$= \boxed{-16}$

e. Find the value of $f(x)$ when $x = -3$.

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

$f(-3) = \boxed{(-3)}^3 + -3 \bullet \boxed{(-3)}^2 + -2 \bullet \boxed{(-3)}$

$= \boxed{-27} + -3 \bullet \boxed{9} + \boxed{6}$

$= \boxed{-27} + \boxed{-27} + \boxed{6}$

$= \boxed{-48}$

f. Evaluate $f(x) = x^3 - 3x^2 - 2x$ for $x = 4$.

$f(\boxed{4}) = \boxed{(4)}^3 + -3 \bullet \boxed{(4)}^2 + -2 \bullet \boxed{(4)}$

$= \boxed{64} + -3 \bullet \boxed{16} + \boxed{-8}$

$= \boxed{64} + \boxed{-48} + \boxed{-8}$

$= \boxed{8}$

g. Is the point **(5, 40)** a solution of the function, $f(x) = x^3 - 3x^2 - 2x$?

$f(\boxed{5}) = \boxed{(5)}^3 + -3 \bullet \boxed{(5)}^2 + -2 \bullet \boxed{(5)}$

$= \boxed{125} + -3 \bullet \boxed{25} + \boxed{-10}$

$= \boxed{125} + \boxed{-75} + \boxed{-10}$

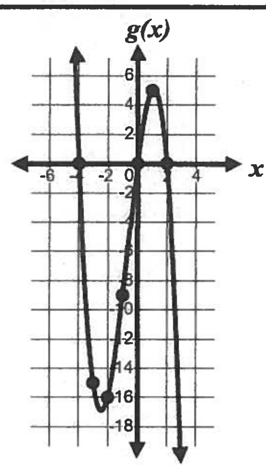
$= \boxed{40}$

Yes or **No?**

2. Reflect: What questions do you have about evaluating linear and non-linear functions?

You Do Together

3.



Use the graph above to find the value of $g(x)$ for each value of x.

a. When $x = 2$, $g(x) = \boxed{0}$

b. When $x = -2$, $g(x) = \boxed{-16}$

c. When $x = -1$, $g(x) = \boxed{-9}$

4. For the function $h(x) = x^2 - 6x + 2$, find the value of $h(-3)$.

$h(-3) = (-3)^2 + -6(-3) + 2$

$= 9 + 18 + 2$

$= 29$

5. For the function $k(x) = 7x - 4$, find the value of $k(8)$.

$k(8) = 7(8) + -4$

$= 56 + -4$

$= 52$

6. Evaluate $t(x) = x^3 - 3x^2 + 4$ for $x = -5$.

$t(-5) = (-5)^3 + -3(-5)^2 + 4$

$= -125 + -3 \cdot 25 + 4$

$= -125 + -75 + 4$

$= -196$

7. Is the point (3, 5) a solution of the function, $t(x) = x^3 - 3x^2 + 4$?

$t(3) = (3)^3 + -3(3)^2 + 4$

$= 27 + -3 \cdot 9 + 4$

$= 27 + -27 + 4$

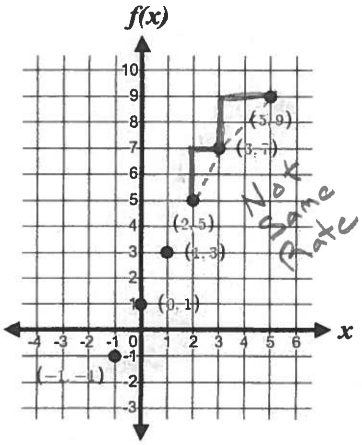
$= 4$

Visual Guided Practice

Name: Key

Learning Target: I will determine if a function is linear or non-linear. **Form A**

We Do Together



1a. Do the values of x and $f(x)$ always change at the same rate? Yes or No

1b. Is the function $f(x)$ linear or non-linear?

Linear or Non-linear

x	0	1	2	3	4
$g(x)$	9	6	3	0	-6

-3 -3 -3 -6 Not Constant

x	-2	-1	0	1	2
$h(x)$	-1	1	3	5	7

2a. Which function above has a constant rate of change? $g(x)$ or $h(x)$

2b. Identify each function as linear or non-linear.

$g(x)$ Linear or Non-linear

$h(x)$ Linear or Non-linear

2c. Find the missing values of $k(x)$ that will make the function linear?

x	-2	-1	0	1	3
$k(x)$	-4	0	4	8	16

4 4 4 8

3a. Use a graphing tool to determine if each function is linear, or not.

$f(x) = 7^2$ Linear or Non-linear

$g(x) = x^2 - 7$ Linear or Non-linear

$h(x) = 2^x + 7$ Linear or Non-linear

$j(x) = -x$ Linear or Non-linear

$k(x) = x^3 + 4$ Linear or Non-linear

$p(x) = 2x + 7$ Linear or Non-linear

$q(x) = x^0 - 7$ Linear or Non-linear

3b. Circle each statement that describes equations of **linear** functions.

The exponent can be a variable. No

There has to be a variable. No... y = 2

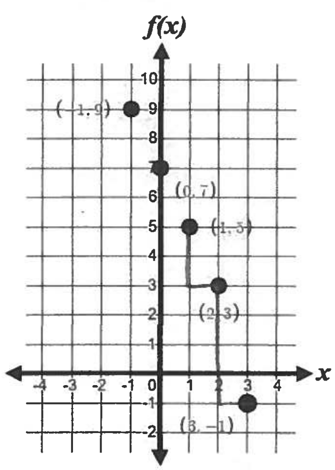
The exponent of the variable can be 0.

The exponent of the variable can be 1.

The exponent of the variable can be 2. No

4. Reflect: What questions do you have about determining if a function is linear or non-linear?

You Do Together



4a. Do the values of x and $f(x)$ always change at the same rate? Yes or No

4b. Is the function $f(x)$ linear or non-linear?

Linear or Non-linear

x	0	1	2	3	4
$g(x)$	6	4	2	0	-4

-2 -2 -2 -4

5a. Does the function $g(x)$ have a constant rate of change? Yes or No

5b. What type of function is $g(x)$?

Linear or Non-linear

5c. Find the missing values of $k(x)$ that will make the function linear?

x	-1	0	1	2	4
$h(x)$	14	9	4	-1	-11

-5 -5 -5 -10

For problems 6 and 7, you may use a graphing tool to support your thinking.

6. Circle each **linear** function.

$f(x) = -x^2 + 1$ | $g(x) = x + 4$

$h(x) = 2^x - 6$ | $j(x) = -2$

$k(x) = -x^1 + 3$ | $l(x) = 2x^0 + 5$

$m(x) = 9x$ | $n(x) = x^5$

7. Circle each **non-linear** function.

$p(x) = 5^x + 1$ | $q(x) = -x$

$r(x) = 4x - 2$ | $t(x) = x^2 - 1$

$u(x) = 9^x + 1$ | $v(x) = 5x$

$w(x) = 6x^1$ | $z(x) = -7$

Visual Guided Practice

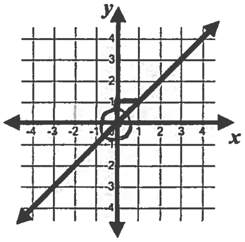
Name: Key

Learning Target: I will identify the graph of linear and non-linear functions. **Form A**

We Do Together

1. Use the graph to find the y-intercept, direction, and slope of each linear function.

$f(x) = x$

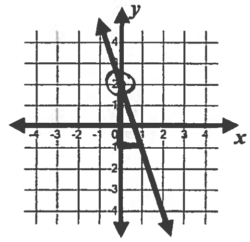


y-intercept = 0

Increasing *or* Decreasing *or* Neither

Slope = 1

$g(x) = -3x + 2$

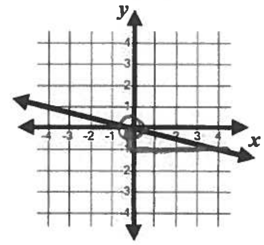


y-intercept = 2

Increasing *or* Decreasing *or* Neither

Slope = -3

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

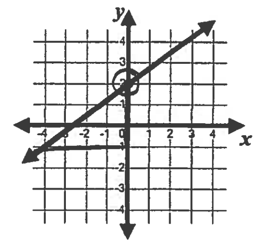


y-intercept = 0

Increasing *or* Decreasing *or* Neither

Slope = $-\frac{1}{4}$

$j(x) = \frac{3}{4}x + 2$



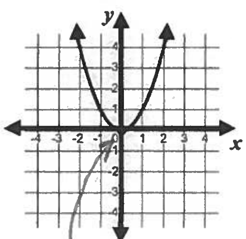
y-intercept = 2

Increasing *or* Decreasing *or* Neither

Slope = $\frac{3}{4}$

2. Use the graph to find the key features of each function.

$k(x) = x^2$



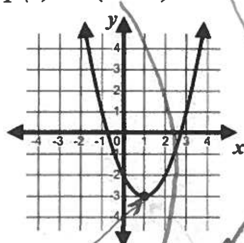
Vertex = (0, 0)

Opens up *or* Opens down

Leading Coefficient = 1

Wider *or* Narrower *or* No Change

$p(x) = (x - 1)^2 - 3$



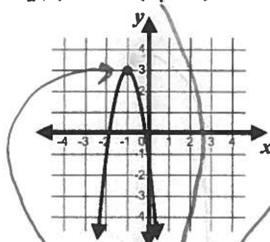
Vertex = (1, -3)

Opens up *or* Opens down

Leading Coefficient = 1

Wider *or* Narrower *or* No Change

$q(x) = -4(x + 1)^2 + 3$



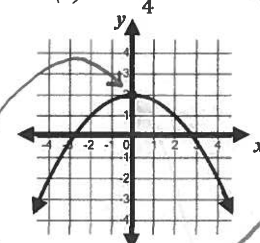
Vertex = (-1, 3)

Opens up *or* Opens down

Leading Coefficient = -4

Wider *or* Narrower *or* No Change

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



Vertex = (0, 2)

Opens up *or* Opens down

Leading Coefficient = $-\frac{1}{4}$

Wider *or* Narrower *or* No Change

3. Reflect: What do you notice about key features of each graph and its equation?

You Do Together: Use what you noticed in problems 1 and 2 to identify key features of each function.

4.

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

y-intercept = 3

Increasing *or* Decreasing *or* Neither

Slope = -2

$g(x) = \frac{2}{3}x + 1$

y-intercept = 1

Increasing *or* Decreasing *or* Neither

Slope = $\frac{2}{3}$

$j(x) = -3(x + 1)^2 + 4$

Vertex: (-1, 4)

Opens up *or* Opens down

Leading Coefficient = -3

Wider *or* Narrower *or* No Change

$k(x) = -\frac{1}{3}x^2 + 3$

Vertex: (0, 3)

Opens up *or* Opens down

Leading Coefficient = $-\frac{1}{3}$

Wider *or* Narrower *or* No Change