What's Going On?

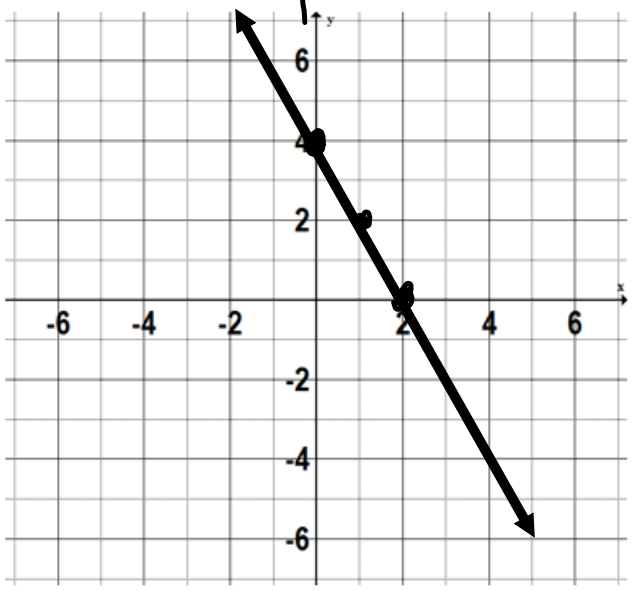
Checking In	Homework Logs
Minds on	Line Graphs
Action!	Equivalent Algebraic Expressions
Consolidation	Partner Challenge

Learning Goal - I will be able to simplify algebraic expressions and identify equivalent expressions.

Minds on

Graphing Lines!

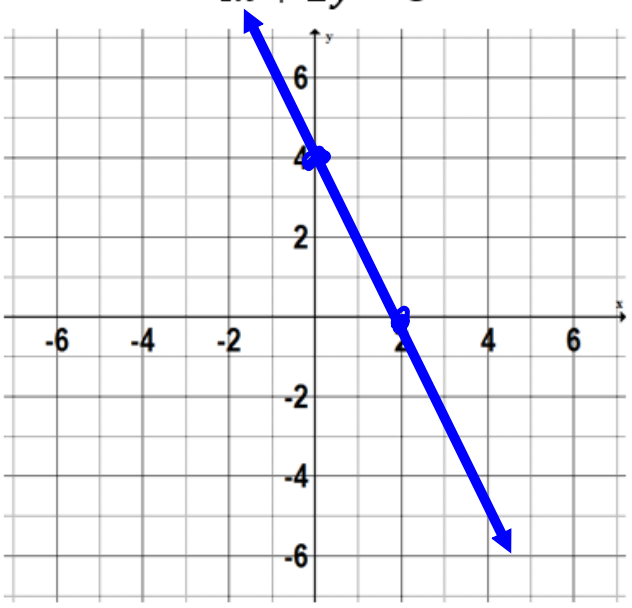
$y = -2x + 4$



Slope: -2

y-Intercept: 4

$4x + 2y = 8$



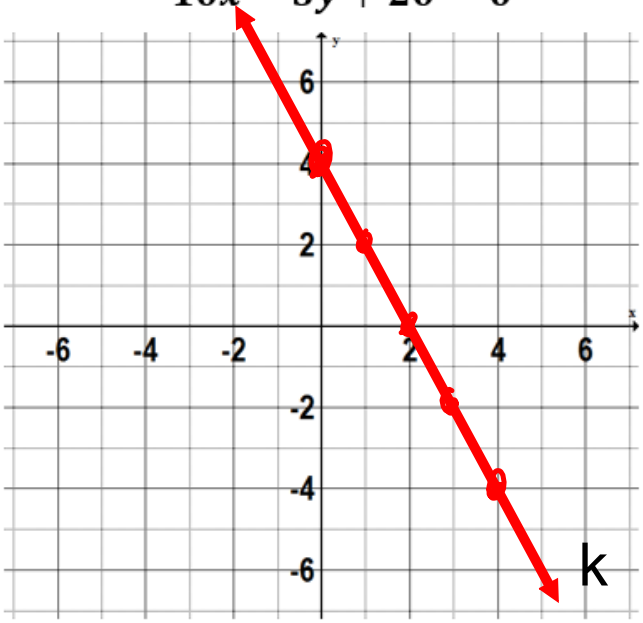
x-Intercept: 2 $4x = 8$

y-Intercept: 4

Minds on

Graphing Lines!

$-10x - 5y + 20 = 0$



Rearrange into **y = mx + b** form, or determine the intercepts.

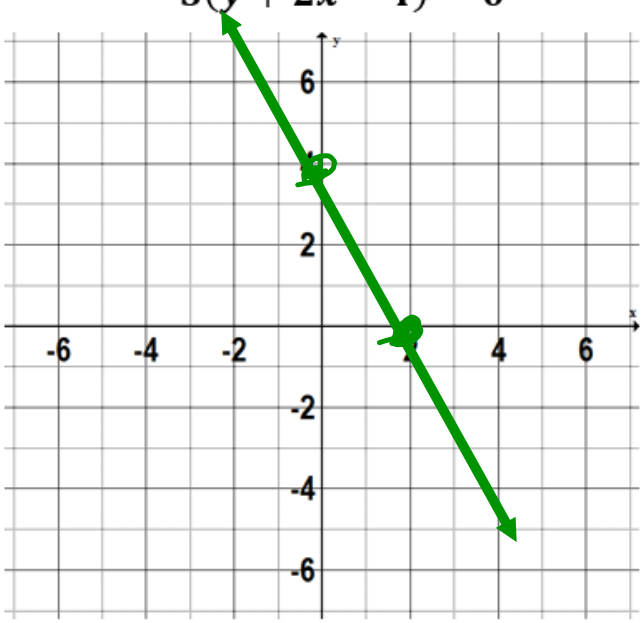
$-10x - 5y + 20 = 0$

$+5y \quad +5y$

$\frac{5y}{5} = \frac{-10x + 20}{5}$

$y = -2x + 4$

$-5(y + 2x - 4) = 0$



Expand and rearrange or make a table of values.

$\frac{-5(y + 2x - 4) = 0}{-5} \quad \frac{}{-5}$

$y + 2x - 4 = 0$

$-2x + 4 \quad -2x$

$+4$

$y = -2x + 4$

Minds on

Graphing Lines!

What do we notice about the graphs of the 4 lines?

The graphs are all the same!

What does this mean about the equation of each line?

Minds on

Graphing Lines!

Let's write each equation as a function of x and see what happens!

$y = -2x + 4$

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

$4x + 2y = 8$

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

$-10x - 5y + 20 = 0$

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

$-5(y + 2x - 4) = 0$

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

Action!

Equivalent Algebraic Expressions

Two polynomial functions or algebraic expressions are equivalent if:

- They simplify algebraically to give the same function or expression
- They produce the same graph
- They are equal for all values in the domain

Two polynomial functions or algebraic expressions are **not** equivalent if:

- They fully simplify algebraically to give a **different** function or expression
- They produce a **different** graph
- They are **not equal** for ANY value in the domain

Action!

Adding and Subtracting Polynomials

Simplify each expression and determine if they are equivalent.

a. $(2x^2 - 3x + 4) - (3x^2 - 4x) + 3(2x^2 + 5x - 9)$

$= 2x^2 - 3x + 4 - 3x^2 + 4x + 6x^2 + 15x - 27$

$= 5x^2 + 16x - 23$

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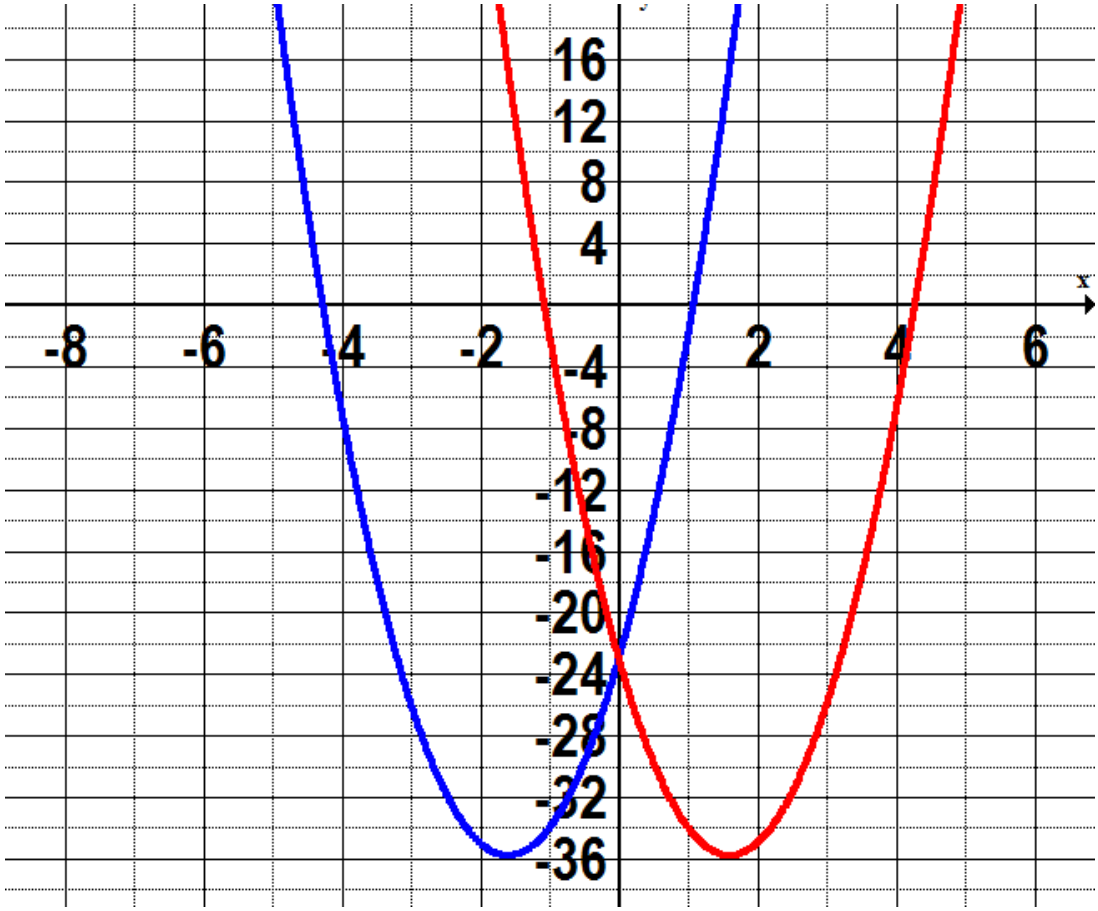
b. $x(3x - 5) - 2(-4x^2 + 6x + 15) - (6x^2 - x - 7)$

$= 3x^2 - 5x + 8x^2 - 12x - 30 - 6x^2 + x + 7$

$= 5x^2 - 16x - 23$

Not equivalent!


16
12
8
4
x
-8
-6
-4
-2
-4
2
4
6
-8
-12
-16
-20
-24
-28
-32
-36

Action!

Equivalent Algebraic Expressions

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$g(t) = 10t - 200$

Are f(t) and g(t) equivalent functions?

Action!

Adding and Subtracting Polynomials

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$g(t) = 10t - 200$

Are f(t) and g(t) equivalent functions?

"Two" methods

1. Simplify and Compare

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$= -5t^2 + 100t + 1000 + 5t^2 - 75t - 1200$

$= 25t - 200$

$g(t) = 10t - 200$

$\therefore$ f(t) is not equivalent to g(t)

Action!

Adding and Subtracting Polynomials

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$g(t) = 10t - 200$

Are f(t) and g(t) equivalent functions?

"Two" methods

2. Substitute numerical values for variable(s)

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$f(0) = (1000) - (1200)$

$= -200$

$g(t) = 10t - 200$

$g(0) = -200$

$f(0) = g(0)$ so the functions may be equivalent

$f(t) = (-5t^2 + 100t + 1000) - (-5t^2 + 75t + 1200)$

$f(1) = (-5 + 100 + 1000) - (-5 + 75 + 1200)$

$= 1095 - (1270)$

$= -175$

$g(t) = 10t - 200$

$g(1) = 10 - 200$

$= -190$

$\neq$

$f(1) \neq g(1)$ and $\therefore$ the expressions are not equivalent.

Action!

Equivalent Algebraic Expressions

Are the expressions $xy + xz + yz$ and $x^2 + y^2 + z^2$ equivalent?

$xy + xz + yz$ $\qquad$ $x^2 + y^2 + z^2$

When $x=0, y=0, z=0$

$(0)(0) + (0)(0) + (0)(0)$ $\qquad$ $0^2 + 0^2 + 0^2$

$= 0$ $\qquad$ $= 0$

When $x=1, y=1, z=1$

$(1)(1) + (1)(1) + (1)(1)$ $\qquad$ $(1)^2 + (1)^2 + (1)^2$

$= 1 + 1 + 1$ $\qquad$ $= 1 + 1 + 1$

$= 3$ $\qquad$ $= 3$

Let's try $x=1, y=2, z=3$

$(1)(2) + (1)(3) + (2)(3)$ $\qquad$ $(1)^2 + (2)^2 + (3)^2$

$= 2 + 3 + 6$ $\qquad$ $= 1 + 4 + 9$

$= 11$ $\qquad$ $= 14$

aha!! they are not equivalent

Action!

Equivalent Algebraic Expressions

Are the given functions equivalent?

f(x) = (2x – 1) + (x – 2) – (x – 3)

and

g(x) = (3x – 2) – (2x + 3) – (-x – 1)

Simplify!

$f(x) = 2x - 1 + x - 2 - x + 3$

$= 2x + 0$

$g(x) = 3x - 2 - 2x - 3 + x + 1$

$= 2x - 4$

the expressions are not equivalent!

Consolidation

Partner Challenge

1. Create 3 algebraic expressions
   - Make sure 2 are equivalent and one is not
2. Exchange algebraic expressions to a partner
3. Race to figure out which are equivalent

Consolidation

Homework!

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