

## What's Going On?

**Checking In**

Homework Logs

**Minds on**

Dinner Party

**Action!**

Adding and Subtracting Polynomials

**Consolidation**

Hey functions, are you equivalent?

**Learning Goal - I will be able to determine if a relation is a function from its mapping diagram, graph, table or equation.**

## Checking In

### Homework Logs

# Hand 'em in!

## Unit 2

# Equivalent Algebraic Expressions

### Lesson 1:

## Adding and Subtracting Polynomials

## Minds on

### Dinner Party

Adam and Mark are hosting a dinner for 400 guests.

Cheers banquet hall has quoted these charges:

- \$500, plus \$10 per person, for food
- \$200, plus \$20 per person, for drinks
- A discount of \$5 per person if the number of guests exceeds 200

Adam and Mark have created two different functions for the total cost, where  $n$  represents the number of guests and  $n > 200$

Adam's cost function:

$$C_1(n) = (10n + 500) + (20n + 200) - 5n$$

Mark's cost function:

$$C_2(n) = (10n + 20n - 5n) + (500 + 200)$$

Are the functions equivalent?

How do you think Adam and Mark came up with their functions?

Adam's cost funcon:

$$\begin{aligned}C_1(n) &= (10n + 500) + (20n + 200) - 5n \\&= \underline{10n} + \underline{500} + \underline{20n} + \underline{200} - \underline{5n} \\&= \underline{25n + 700}\end{aligned}$$

Mark's cost funcon:

$$\begin{aligned}C_2(n) &= (10n + 20n - 5n) + (500 + 200) \\&= \underline{10n} + \underline{20n} - \underline{5n} + \underline{500} + \underline{200} \\&= \underline{25n + 700}\end{aligned}$$

**Are the funcons equivalent?**

Yes

## Action!

### Equivalent Algebraic Expressions

Two polynomial functions or algebraic expressions are equivalent if:

- They simplify algebraically to give the same function or expression **AND**
- They produce the same graph

Two polynomial functions or algebraic expressions are not equivalent if:

- They result in different values when they are evaluated with the same numbers substituted for the variable(s)

**Action!**

## Adding and Subtracting Polynomials

**Simplify**

$$\begin{aligned} & \underline{(2x^2 - 3x + 4)} - \underline{1(3x^2 - 4x)} + \underline{3(2x^2 + 5x - 9)} \\ &= \underline{2x^2} - \underline{3x} + \underline{4} - \underline{3x^2} + \underline{4x} + \underline{6x^2} + \underline{15x} - \underline{27} \\ &= 5x^2 + 16x - 23 \end{aligned}$$

## Action!

### Equivalent Algebraic Expressions

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

$$f(t) = \cancel{-5t^2} + 100t + 1000 \quad \cancel{+5t^2} - 75t - 1200$$

$$f(t) = 25t - 200$$

$$g(t) = 10t - 200$$

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

NO



**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

*What we did*

**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)**

If you substitute in a particular value and the two functions come out the same, this does NOT mean that they are equivalent.

If you substitute in a particular value and the two functions come out different, this means they are not equivalent.

**Action!**

## Equivalent Algebraic Expressions

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

$$f(x, y, z) = xy + xz + yz$$

$$g(x, y, z) = x^2 + y^2 + z^2$$

If  $f(x, y, z) \neq g(x, y, z)$  for some values  $x, y, z$  then  $f(x, y, z)$  is not equivalent to  $g(x, y, z)$

$$\begin{aligned} f(1, 2, 3) &= (1)(2) + (1)(3) + (2)(3) \\ &= 2 + 3 + 6 \\ &= 11 \end{aligned}$$

$$\begin{aligned} g(1, 2, 3) &= (1)^2 + (2)^2 + (3)^2 \\ &= 1 + 4 + 9 \\ &= 14 \end{aligned}$$

Because  $f(1, 2, 3) \neq g(1, 2, 3)$ ,  $f$  and  $g$  are not equivalent.

## Consolidation

Hey functions, are you equivalent?

Are the given functions equivalent?

$$\begin{aligned}
 f(x) &= (2x - 1) + (x - 2) - (x - 3) \\
 &= \underline{2x} - \underline{1} + \underline{x} - \underline{2} - \underline{x} + \underline{3} \\
 &= 2x + 0
 \end{aligned}$$

and

$$\begin{aligned}
 g(x) &= (3x - 2) - (2x + 3) - (-x - 1) \\
 &= \underline{3x} - \underline{2} - \underline{2x} - \underline{3} + \underline{x} + \underline{1} \\
 &= 2x - 4
 \end{aligned}$$

The functions are not equivalent.

## Consolidation

NEW TERMS

Equivalent - same



Algebraic Expression

Polynomial

## Consolidation

# Homework!

**Pg. 88:** 1 - 8, 10 - 12  
*"some"*

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