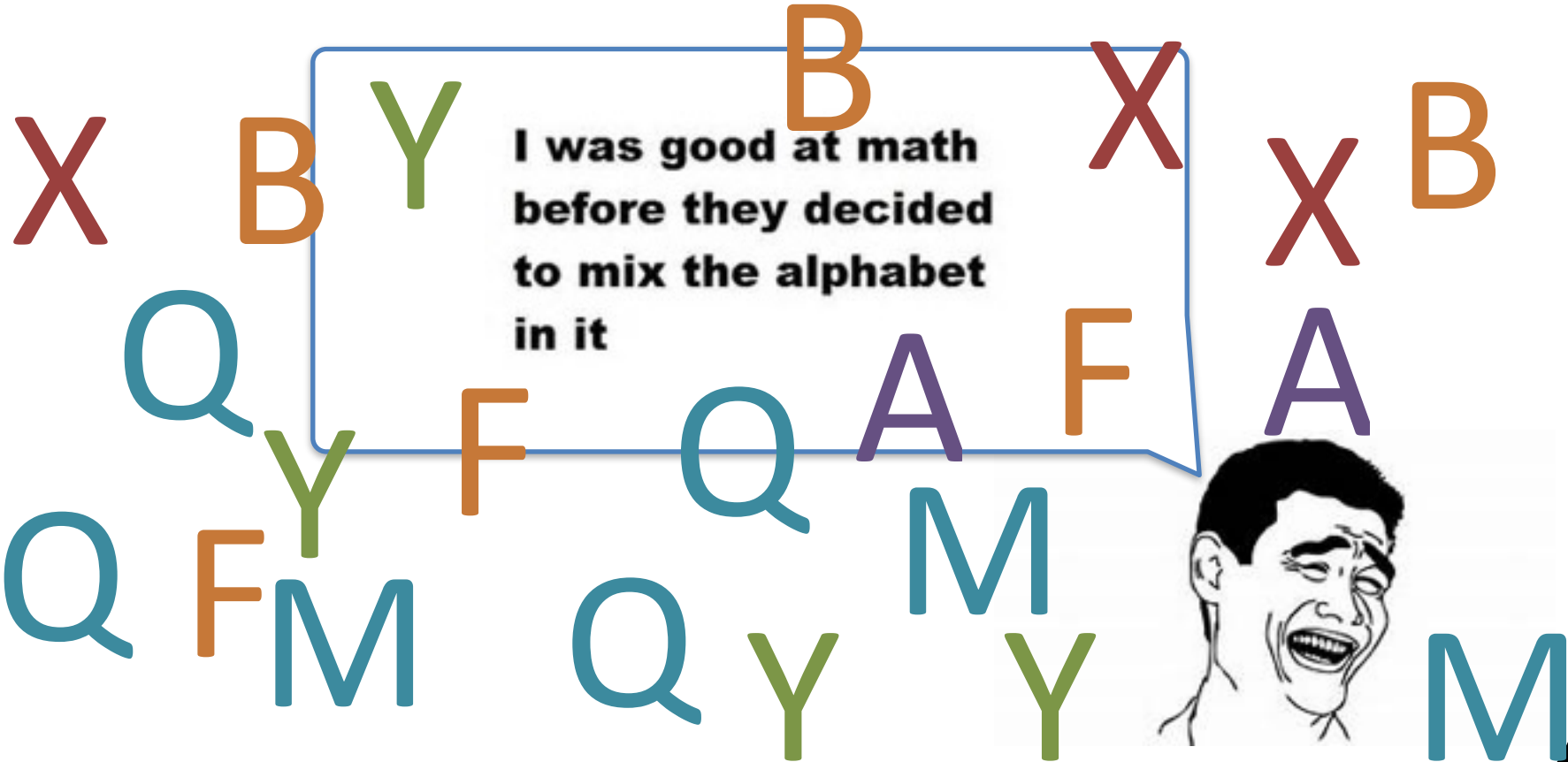


Lesson 2.3.2 – Adding, Subtracting, Multiplying and Dividing Functions

I was good at math
before they decided
to mix the alphabet
in it



By the end of this lesson, I will be able to answer the following questions...

1. How do I add, subtract, multiply and divide functions?
2. How do I read function notation?
3. Why do fractions containing polynomials sometimes have “BAD” values.
4. How are the “BAD” reflected in the domain?



Vocabulary

1. $(f + g)(x) = f(x) + g(x)$

2. $(f - g)(x) = f(x) - g(x)$

3. $(f \cdot g)(x) = f(x) \cdot g(x)$

4. $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

5. **Undefined Values** – a value that is not in the domain of the function

Prerequisite Skills with Practice

$$\frac{0}{\text{Anything except } 0} =$$

ALWAYS ZERO

$$\frac{\text{Anything}}{0} =$$

ALWAYS UNDEFINED

Example One

Performing function operations from function notation

Let $f(x) = x^2 - 3x + 4$

and $g(x) = x^2 + 6x - 3$

Build a new function, $h(x)$ for which $h(x) = (f + g)(x)$

Example Two

Performing function operations from function notation

Keeping the same $f(x)$ and $g(x)$ above, build a new function $w(x)$ for which

$$w(x) = (f - g)(x)$$

Lesson 2.3.2

Examples 1 & 2

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$$h(x) = (f + g)(x) \rightarrow f(x) + g(x) =$$

$$(x^2 - 3x + 4) + (x^2 + 6x - 3)$$

$$\underline{x^2} - \underline{3x} + \underline{4} + \underline{x^2} + \underline{6x} - \underline{3}$$

$$2x^2 + 3x + 1$$

$$h(x) = 2x^2 + 3x + 1$$

$$w(x) = (f - g)(x) \rightarrow f(x) - g(x)$$

$$(x^2 - 3x + 4) - (x^2 + 6x - 3)$$

$$x^2 - 3x + 4 - (x^2 + 6x - 3)$$

$$\underline{x^2} - \underline{3x} + \underline{4} - \underline{x^2} - \underline{6x} + \underline{3}$$

$$-9x + 7$$

$$h(x) = -9x + 7$$

Example Three

Performing function operations from function notation

$$\text{Let } f(x) = 3x + 4$$

$$\text{and } g(x) = 5x - 2$$

Build a new function, $h(x)$,

For which $h(x) = (f \cdot g)(x)$

Example Four

Performing function operations from function notation and finding restrictions

$$\text{For } f(x) = 3x^2 + 13x - 10$$

$$\text{and } g(x) = x + 5,$$

$$\text{find } \left(\frac{f}{g}\right)(x)$$

What are the restrictions for $\left(\frac{f}{g}\right)(x)$

Lesson 2.3.2

Examples 3 & 4

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$$h(x) = (f \cdot g)(x) \rightarrow f(x) \cdot g(x)$$

$$(3x+4)(5x-2)$$

$$(3x+4)(5x-2)$$

$$15x^2 - 6x + 20x - 8$$

$$15x^2 + 14x - 8$$

$$h(x) = 15x^2 + 14x - 8$$

$$\left(\frac{f}{g}\right)(x) \rightarrow \frac{f(x)}{g(x)} \rightarrow \frac{3x^2 + 13x - 10}{x + 5}$$

$$\frac{3x^2 + 13x - 10}{x + 5}$$

Finding restrictions: Set denominator to zero

$$x + 5 = 0$$

$$x = -5$$

So $x \neq -5$ because that would make the denominator zero - and that would be bad.

THE END



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