Warm Up

1. Given the table of values below, what is the possible parent function, $f(x)$?

x	$f(x) + 3$
−2	7
−1	4
0	3
1	4
2	7

A. $f(x) = x$ B. $f(x) = |x|$

C. $f(x) = x^2$ D. $f(x) = \sqrt{x}$

2. Let $f(x) = x^2$ and $g(x)$ be $f(x)$ reflected over the x-axis and translated to the left 7 units. Which table represents this translation?

A.

x	$g(x)$
0	−49
1	−36
2	−25

B.

x	$g(x)$
0	−7
1	−8
2	−11

C.

x	$g(x)$
0	−49
1	−64
2	−81

D.

x	$g(x)$
0	7
1	6
2	3

3. What happens to the graph of a function if you replace x with $5x$ in its equation?

A. vertical expansion by a factor of 5

B. horizontal expansion by a factor of 5

C. horizontal compression by a factor of $\frac{1}{5}$

D. horizontal shifting by 5 units

4. Let $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{(x+3)}$.

Describe the transformation from $f(x)$ to $g(x)$.

A. translated 3 units to the right

B. translated 3 units up

C. translated 3 units to the left

D. translated 3 units down

5. The graph of $y = \sqrt{\frac{3}{2}x}$ is the image of $y = \sqrt{x}$ after:

A. horizontal compression by a factor of $\frac{2}{3}$

B. vertical compression by a factor of $\frac{2}{3}$

C. vertical expansion by a factor of $\frac{3}{2}$

D. horizontal and vertical expansion by a factor of $\frac{3}{2}$

1.6 Combinations and Compositions of functions

Combinations

Addition $(f+g)(x)$

Subtraction $(f-g)(x)$

Multiplication $(fg)(x)$

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

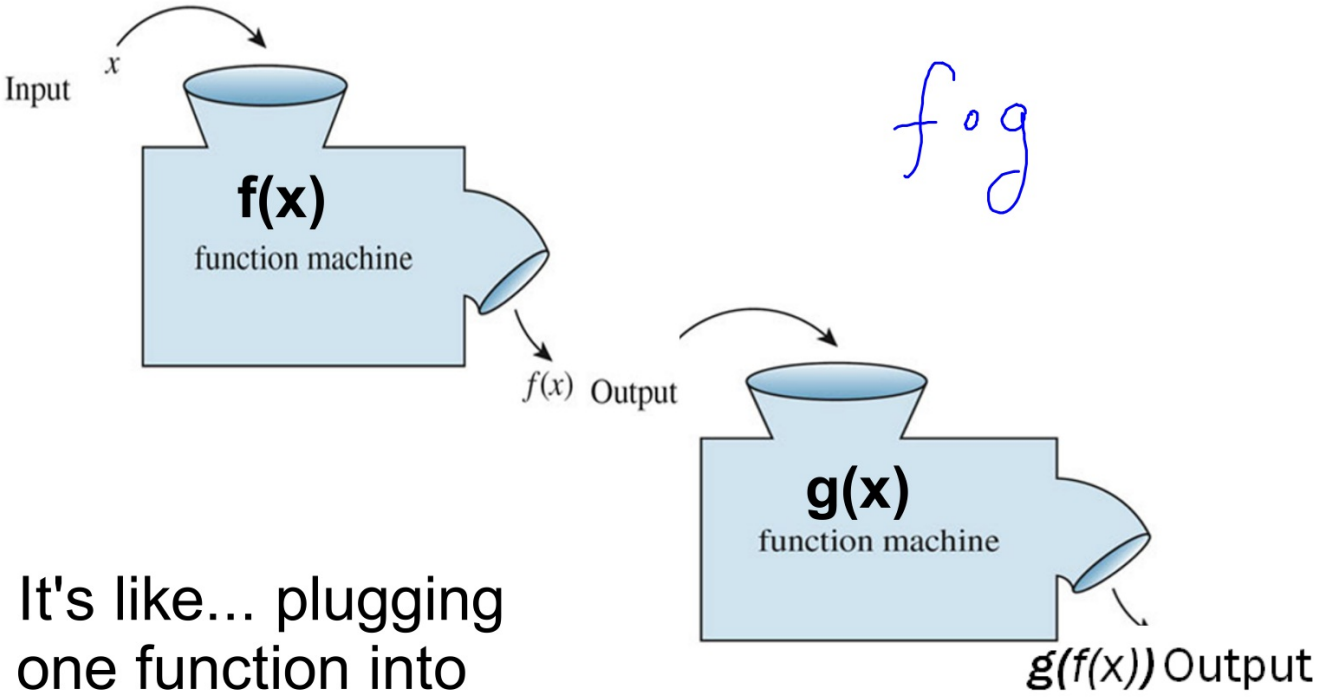
1.6 Combinations of Functions

1. **Addition Rule →** $(f+g)(x) = f(x)+g(x)$
2. **Subtraction Rule →** $(f-g)(x) = f(x)-g(x)$
3. **Multiplication Rule →** $(f \cdot g)(x) = f(x) \cdot g(x)$
4. **Division/Quotient Rule →** $(f/g)(x) = \frac{f(x)}{g(x)}$

1.6 Compositions of Functions

$f \circ g$ $\qquad\qquad$ $g \circ f$

1.6 Compositions of Functions



$f \circ g$

It's like... plugging one function into another function

A **composition** of two functions is like... nesting dolls because one function gets plugged into another function.

Composition of Functions

$f(x) = 2x^2 + 1$	**Compositions of Functions**	$g(x) = 3x$

f∘g

$f \circ g \Rightarrow f(g(x))$ plug $g(x)$ into $f(x)$!

g∘f

$g \circ f \Rightarrow g(f(x))$ plug $f(x)$ into $g(x)$!

Checkpoint 2

Given $f(x) = x + 2$ and $g(x) = 4 - x^2$, find the following.

a. $(f \circ g)(x)$ **b.** $(g \circ f)(x)$ **c.** $(g \circ f)(-2)$

P-I-G

Exit Ticket

In complete sentences and using examples where needed:

- explain the difference between **combinations** and **compositions**!