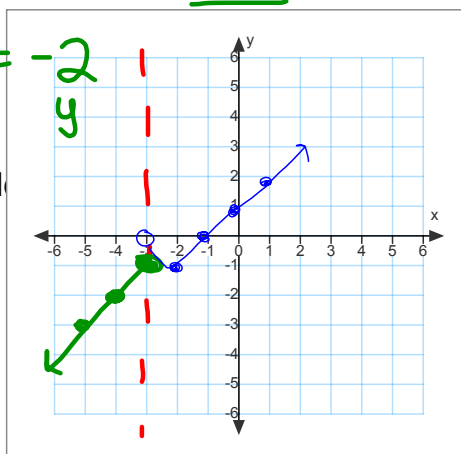


## Warm up

1. Graph the piecewise function  $f(x) = \begin{cases} |x+2|-1 & x > -3 \\ x+2, & x \leq -3 \end{cases}$

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



2. Is  $f(x) = 2x^3 + 5$  even, odd,

$$f(-x) = 2(-x)^3 + 5 = -2x^3 + 5$$

neither

3. Write an equation for a cubic function that has been reflected over the x-axis, vertically shrunk by a factor of 3, moved left 2 and up 7.

$$-\frac{1}{3}(x+2)^3 + 7$$

4. If  $(-1, 3)$  is a point on  $f(x)$  find its transformation on  $-2f(3x-9)-4$ .

$$-2f(3(x-3))-4$$

reflect x (indicated by a red arrow pointing to the negative sign)  
 v. stretch (indicated by a green arrow pointing to the 2)  
 H. shrink (indicated by a blue arrow pointing to the 3)  
 Right 3 (indicated by a black arrow pointing to the -3)  
 down 4 (indicated by a black arrow pointing to the -4)

$$(-1, 3)$$

$$(-1, -3)$$

$$(-1, -6)$$

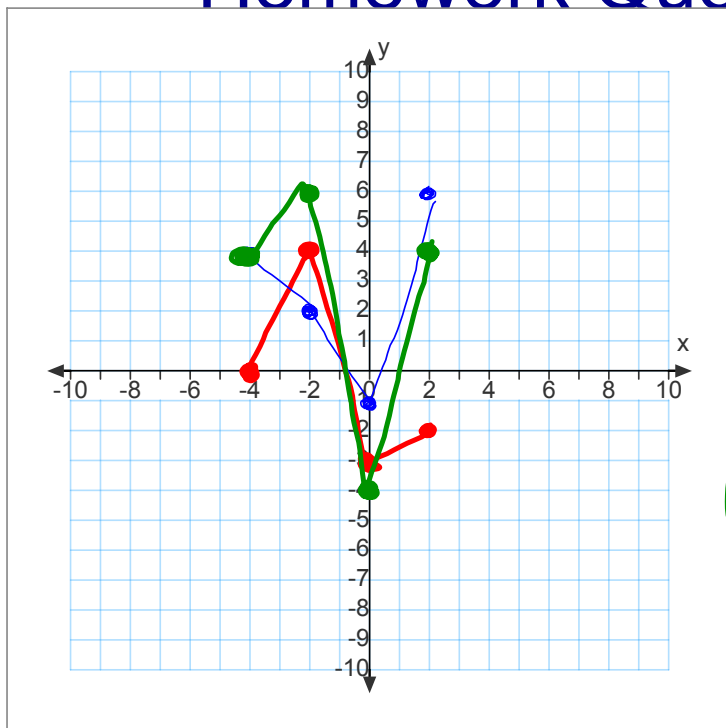
$$(-1/3, -6)$$

$$(2^2/3, -10)$$

GO COUGARS!



## Homework Questions



$f(x)$   
 $g(x)$   
 $(f+g)(x)$

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$$f(x) = \sqrt{x+6}$$

$$f \circ g(x)$$

$$\sqrt{(x^2-5)+6}$$

$$\sqrt{x^2+1}$$

$$g(x) = x^2 - 5$$

$$g \circ f(x)$$

$$(\sqrt{x+6})^2 - 5$$

$$x+6-5$$

$$x+1$$

## 1.5 Combinations and Compositions of Functions

Domains of Compositions

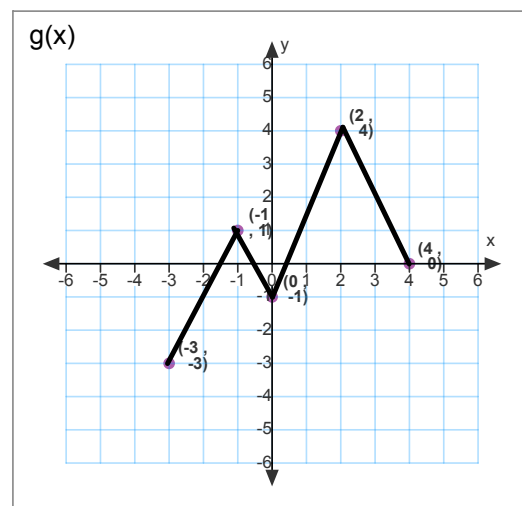
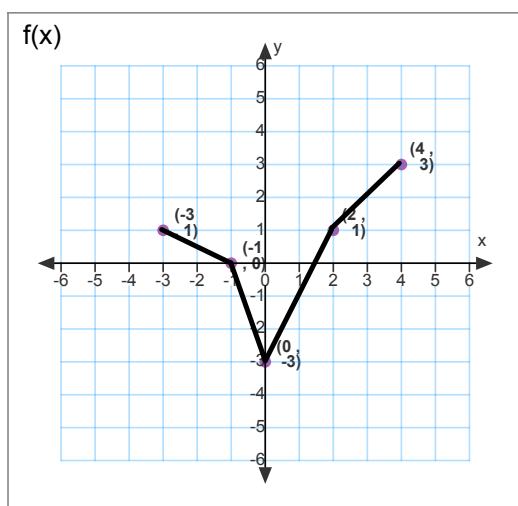
Graphical Combinations and Compositions

When we are finding the domain of a composition we need to consider the domains of each function.

$$\begin{aligned}
 f(x) &= \sqrt{x+3} \\
 D: &[-3, \infty) \\
 g \circ f & \\
 4(\sqrt{x+3})^2 + 5 & \\
 4x + 17 & \\
 [-3, \infty) &
 \end{aligned}$$

$$\begin{aligned}
 g(x) &= 4x^2 + 5 \\
 D: &(-\infty, \infty) \\
 f \circ g(x) & \\
 \sqrt{(4x^2 + 5) + 3} & \\
 \sqrt{4x^2 + 8} & \\
 D: &(-\infty, \infty)
 \end{aligned}$$

## Graphical Combinations and Compositions of Functions



find a.  $(f + g)(2)$  b.  $\frac{f}{g}(-1)$

$$\begin{aligned} f(2) + g(2) &= 1 + 4 = 5 \\ \frac{0}{1} &= 0 \end{aligned}$$

c.  $f \circ g(4)$  d.  $g \circ f(0)$

$$\begin{aligned} f(g(4)) &= f(0) = -3 \end{aligned}$$

## HOMEWORK



p 58 3, 8, 26, 39-43 odd, 49, 58, 61-64 all

$$(x+1) \quad (x+2)$$

$$-5(x+1)^2 - 3(x+1) + 1$$

$$x \neq -2$$

$$x \geq \frac{3}{2} \quad \left[ \frac{3}{2}, \infty \right)$$

$$3\left(-\frac{1}{3}x - 5\right)^3 + 3$$

$$3\left(-\frac{1}{3}(x+15)\right)^3 + 3$$