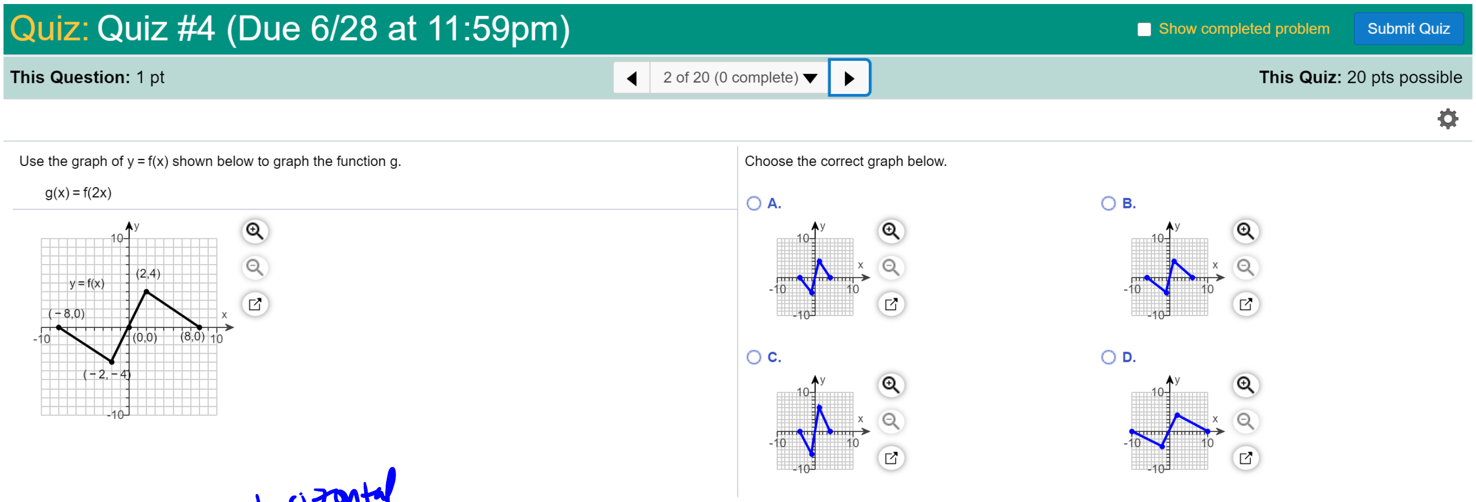


Quiz: Quiz #4 (Due 6/28 at 11:59pm)

This Question: 1 pt

This Quiz: 20 pts possible

Use the graph of y = f(x) shown below to graph the function g.

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

Choose the correct graph below.

○ A.

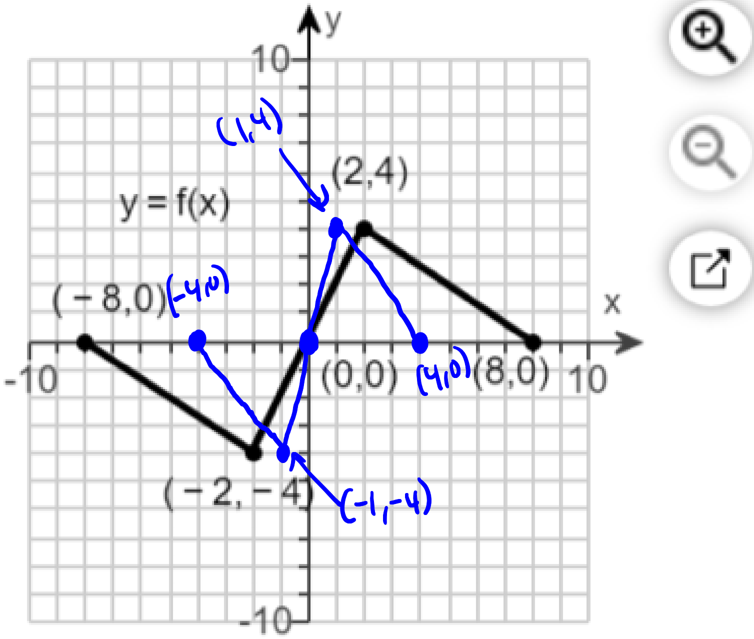
○ B.

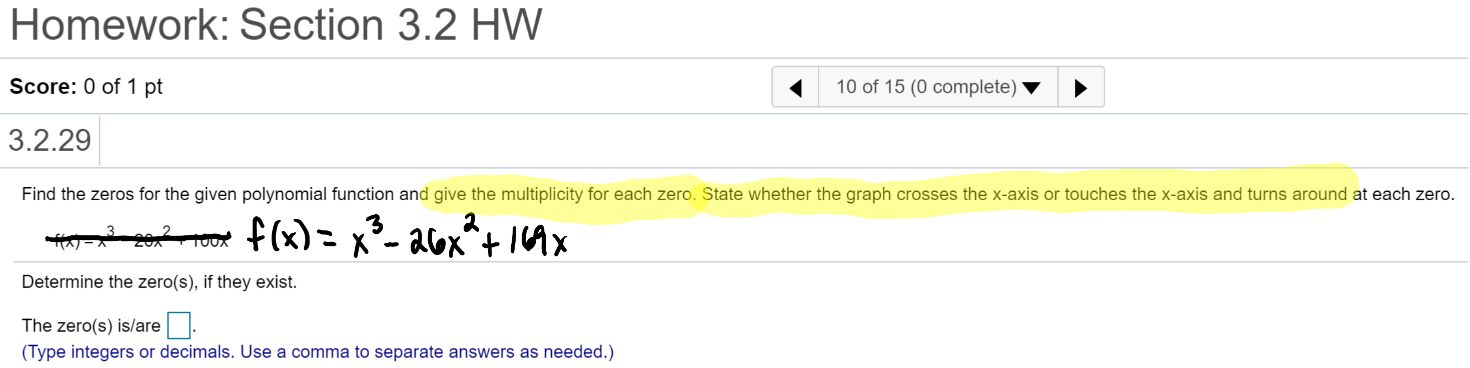
○ C.

○ D.

horizontal
↓ shrink

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





Homework: Section 3.2 HW

Score: 0 of 1 pt

3.2.29

Find the zeros for the given polynomial function and give the multiplicity for each zero. State whether the graph crosses the x-axis or touches the x-axis and turns around at each zero.

~~$f(x) = x^3 - 20x^2 + 100x$~~ $f(x) = x^3 - 26x^2 + 169x$

Determine the zero(s), if they exist.

The zero(s) is/are ☐.

(Type integers or decimals. Use a comma to separate answers as needed.)

$$0 = x^3 - 26x^2 + 169x$$

$$0 = x(x^2 - 26x + 169)$$

$$0 = x(x-13)(x-13)$$

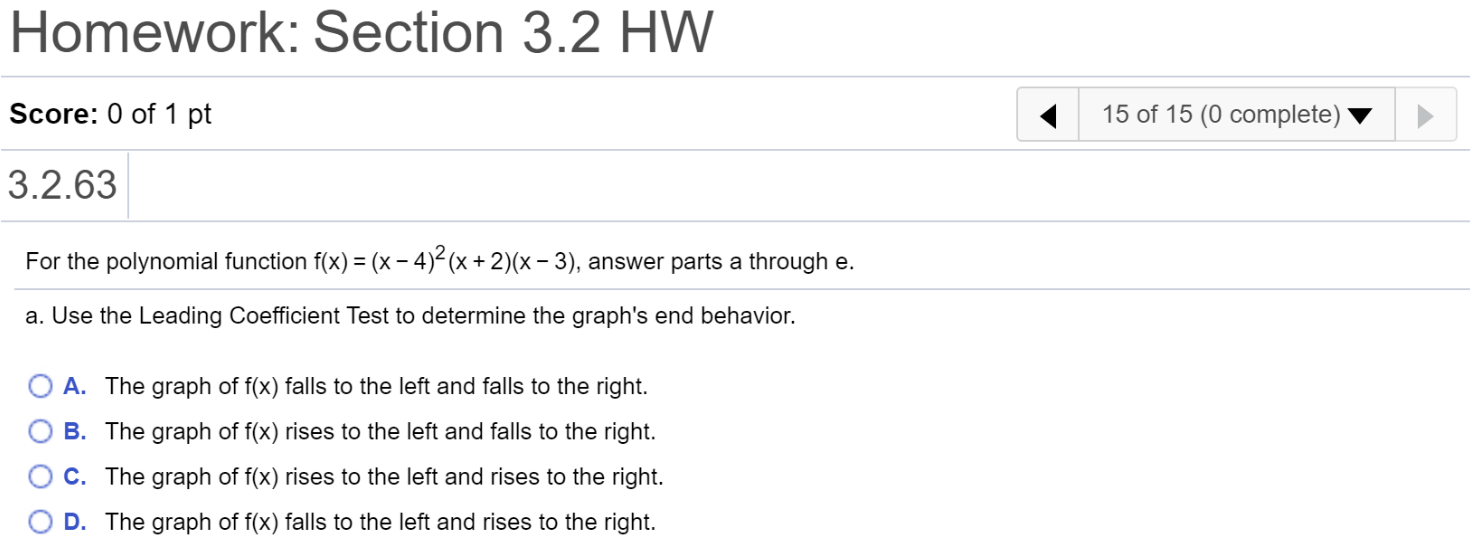
$0 = x^{\textcircled{1}}(x-13)^{\textcircled{2}}$

$x=0$ $\quad$ $x=13$

mult = 1 $\quad$ mult = 2

odd ⇒ crosses through the x-axis

even ⇒ touch the x-axis and turn around



Homework: Section 3.2 HW

Score: 0 of 1 pt

15 of 15 (0 complete)

3.2.63

For the polynomial function $f(x) = (x-4)^2(x+2)(x-3)$, answer parts a through e.

a. Use the Leading Coefficient Test to determine the graph's end behavior.

- ○ **A.** The graph of f(x) falls to the left and falls to the right.
- ○ **B.** The graph of f(x) rises to the left and falls to the right.
- ○ **C.** The graph of f(x) rises to the left and rises to the right.
- ○ **D.** The graph of f(x) falls to the left and rises to the right.

$f(x) = 1(x-4)^{\textcircled{2}}(x+2)(x-3)$

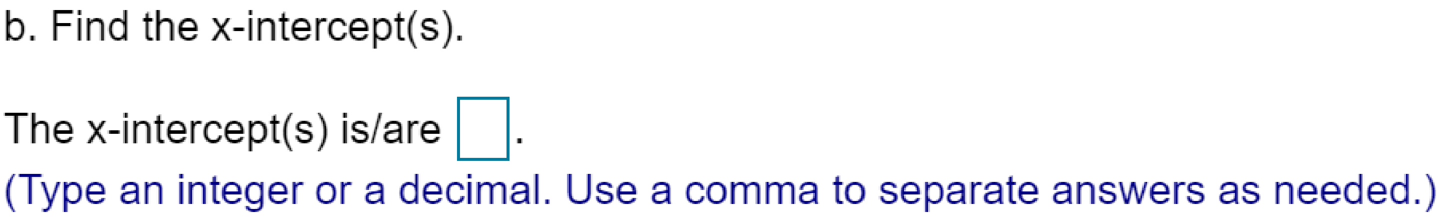
$1 \cdot x^2 \cdot x \cdot x$

$1 \cdot x^{\textcircled{4}}$ ← even

positive

rise to the left

rise to the right



b. Find the x-intercept(s).

The x-intercept(s) is/are ☐.

(Type an integer or a decimal. Use a comma to separate answers as needed.)

$0 = (x-4)^2(x+2)(x-3)$

$(x-4)^{\textcircled{2}} = 0$ $\quad$ $(x+2)^{\textcircled{1}} = 0$ $\quad$ $x-3=0$

$x=4$	$x=-2$	$x=3$
mult $=2$	mult $=1$	mult $=1$
even	odd	odd
touches and turns around	crosses through	crosses through

c. Find the y-intercept.

The y-intercept is ☐.

(Simplify your answer.)

$$f(0) = (0-4)^2(0+2)(0-3)$$
$$= (-4)^2(2)(-3)$$
$$= -96$$

d. Determine whether the graph has y-axis symmetry, origin symmetry, or neither. Choose the correct answer below.

○ **A.** The graph of f is symmetric about the origin.

○ **B.** The graph of f is symmetric about the y-axis.

○ **C.** The graph of f is neither symmetric about the y-axis nor symmetric about the origin.

$$f(x) = (x-4)^2(x+3)(x-2)$$
$$f(-x) = \underbrace{(-x-4)^2}_{\cancel{(-1)^2}(x+4)}\underbrace{(-x+3)}_{-1(x-3)}\underbrace{(-x-2)}_{-1(x+2)}$$

$(-1)(-1)=1$

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

same sign opp same sign opp same sign opp

neither even nor odd

even ⇒ symmetric about the y-axis

odd ⇒ symmetric about the origin

$f(-x) = f(x)$ ⇒ even function

$f(-x) = -f(x)$ ⇒ odd function

ex. $f(x) = -6x^5 - 2x^3 + 10x$

$$f(-x) = -6(-x)^5 - 2(-x)^3 + 10(-x)$$
$$= -6(-x^5) - 2(-x^3) + 10(-x)$$
$$= \boxed{6x^5 + 2x^3 - 10x}$$

pos pos neg

whole thing is opposite

↓

odd function

$$= \boxed{-(-6x^5 - 2x^3 + 10x)}$$

$$= -f(x)$$

ex. $f(x) = 7x^6 - 4x^4 + 2$

$$f(-x) = 7(-x)^6 - 4(-x)^4 + 2$$

$$= \underset{\text{same}}{7x^6 - 4x^4 + 2}$$

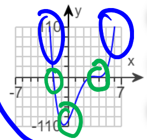
$$= f(x)$$ even function

$$(-x)(-x)(-x)(-x) = x^4$$

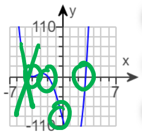
pos neg pos

e. If necessary, find a few additional points and graph the function. Use the maximum number of turning points to check whether it is drawn correctly. Choose the correct graph below.

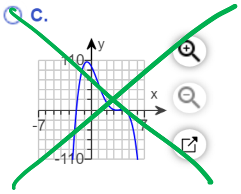
[✓ ○ A.]



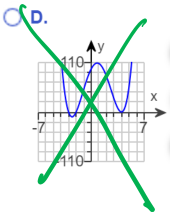
○ B.

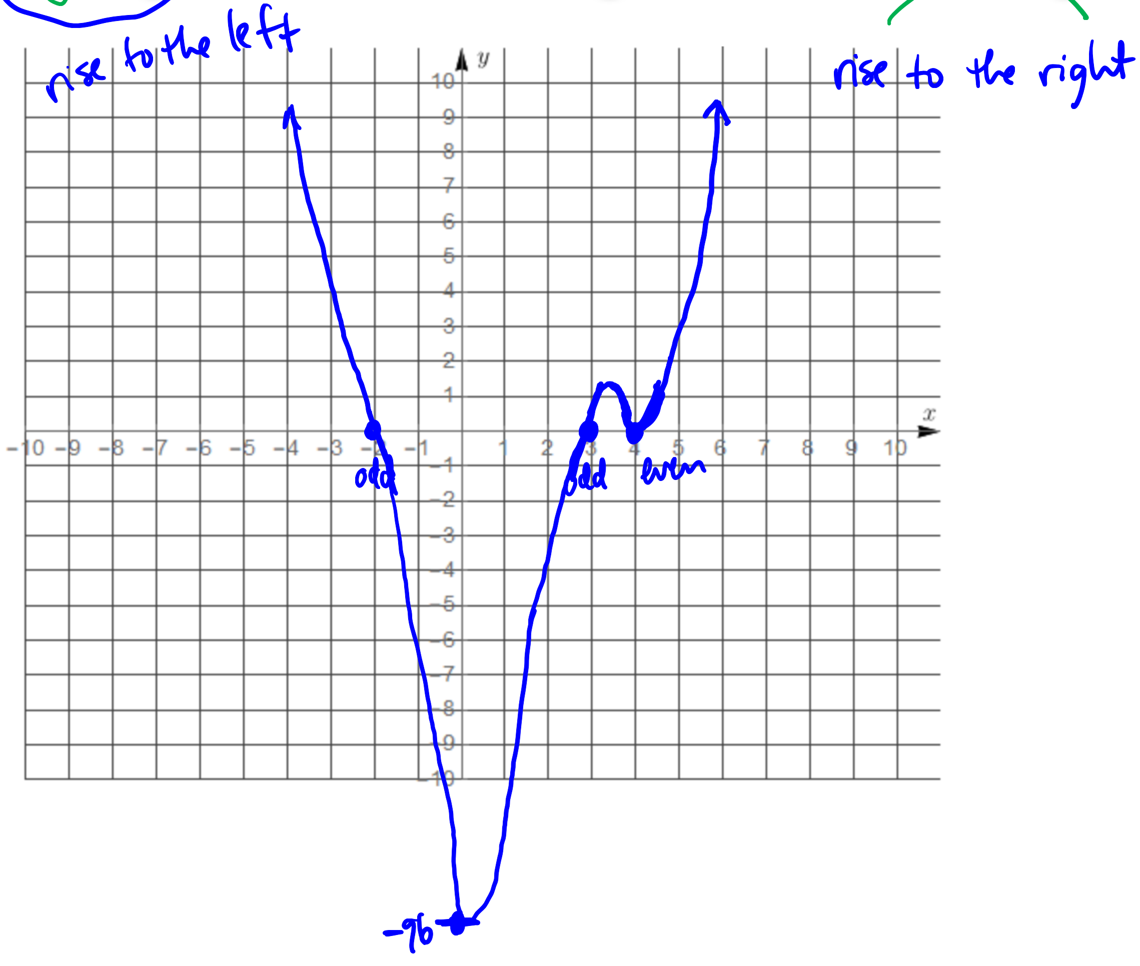


○ C.



○ D.





Homework: Section 2.6 HW

Score: 0 of 1 pt ◀ 14 of 16 (0 complete) ▼ ▶

2.6.57

For $f(x) = x^2 + 4$ and $g(x) = x^2 - 7$, find the following functions.

a. $(f \circ g)(x)$; **b.** $(g \circ f)(x)$; **c.** $(f \circ g)(3)$; **d.** $(g \circ f)(3)$

a. $(f \circ g)(x) =$ ☐
(Simplify your answer.)

$$(f \circ g)(x) = f(g(x))$$

$$f(\underset{x^2-7}{\cancel{x}}) = \underset{x^2-7}{\cancel{x}}^2 + 4$$

$$= f(x^2-7)$$

$$= \underbrace{(x^2-7)}^2 + 4$$

$$(x^2-7)(x^2-7) = x^4 - 7x^2 - 7x^2 + 49$$

$$= x^4 - 14x^2 + 49$$

$$= x^4 - 14x^2 + 49 + 4$$

$$= x^4 - 14x^2 + 53$$

$$b)\ (g \circ f)(x) = g(f(x))$$

$$= g(x^2+4)$$

$$= (x^2+4)^2 - 7$$

$$= x^4 + 8x^2 + 16 - 7$$

$$= x^4 + 8x^2 + 9$$

$$d)\ (g \circ f)(3) = 3^4 + 8(3)^2 + 9$$

$$= 81 + 8(9) + 9$$

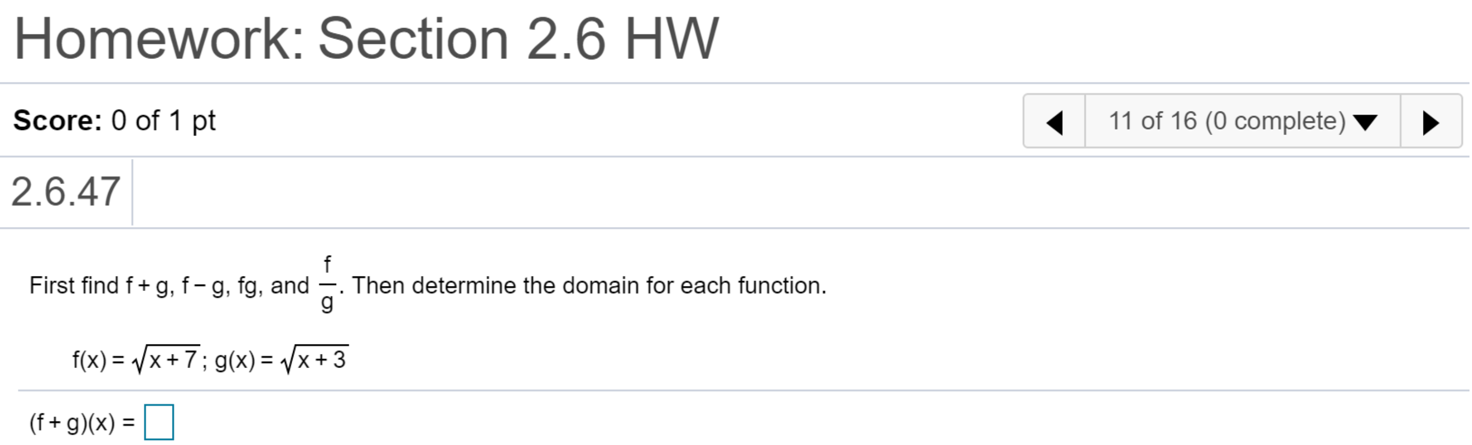
$$= 81 + 72 + 9 = \boxed{162}$$

OR

$$g(\underset{\sim}{f(3)})$$

$$f(3) = 3^2 + 4 = 9 + 4 = 13$$

$$g(13) = 13^2 - 7 = \boxed{162}$$



Homework: Section 2.6 HW

Score: 0 of 1 pt

2.6.47

First find f + g, f − g, fg, and $\frac{f}{g}$. Then determine the domain for each function.

$f(x) = \sqrt{x+7}$; $g(x) = \sqrt{x+3}$

$(f+g)(x) = ☐$

$f(x)+g(x)$

$\underbrace{\sqrt{x+7}} + \underbrace{\sqrt{x+3}}$

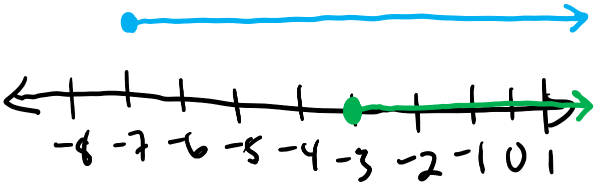
$x+7 \geq 0$

$-7 \quad -7$

$x \geq -7$

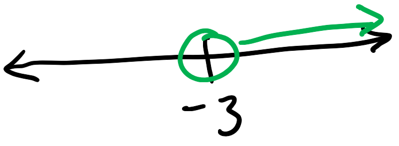
$x+3 \geq 0$

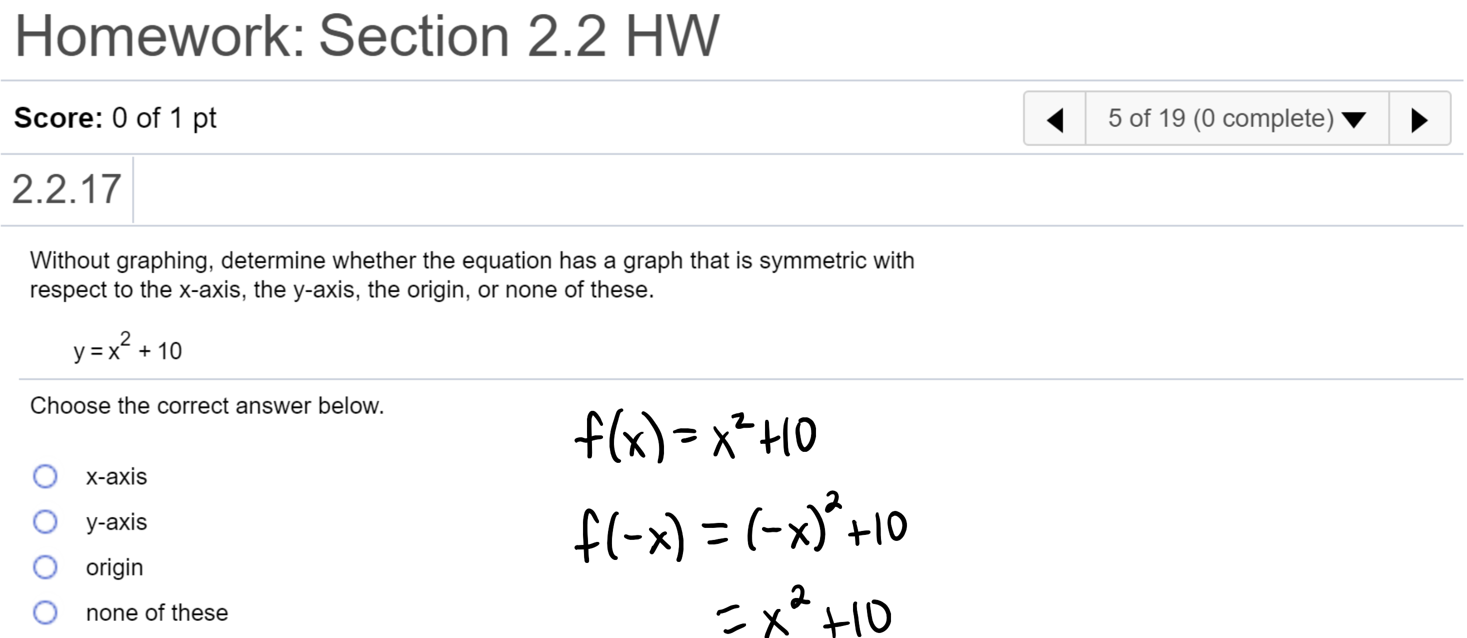
$x \geq -3$



$\frac{f}{g}(x) = \frac{\sqrt{x+7}}{\sqrt{x+3}}$ $\rightarrow x \geq -7$

$\sqrt{x+3} \rightarrow x+3 > 0 \rightarrow x > -3$





Homework: Section 2.2 HW

Score: 0 of 1 pt

2.2.17

Without graphing, determine whether the equation has a graph that is symmetric with respect to the x-axis, the y-axis, the origin, or none of these.

$y = x^2 + 10$

Choose the correct answer below.

○ x-axis

○ y-axis

○ origin

○ none of these

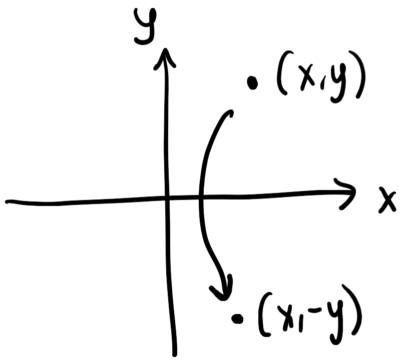
$f(x) = x^2+10$

$f(-x) = (-x)^2+10$

$= x^2+10$

$= f(x)$ ⇒ even function ⇒ symmetric about the y-axis ex. $x=y^2+10$

x-axis symmetry →

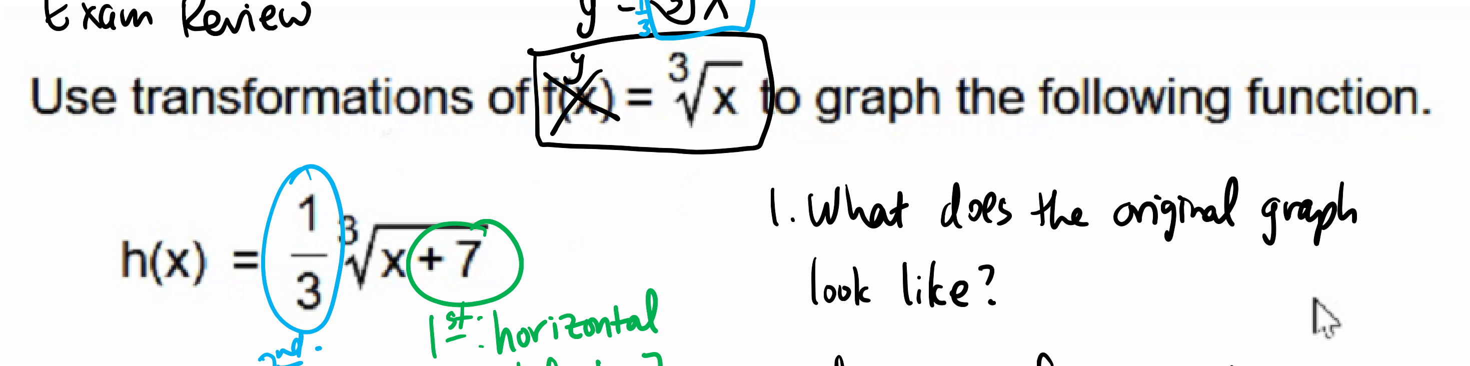


$x=(-y)^2+10$

$x=y^2+10$ ← same as we started with

Exam Review

$y = \boxed{\frac{1}{3}\sqrt[3]{x}}$



Use transformations of $\boxed{\cancel{f(x)}^{\,y} = \sqrt[3]{x}}$ to graph the following function.

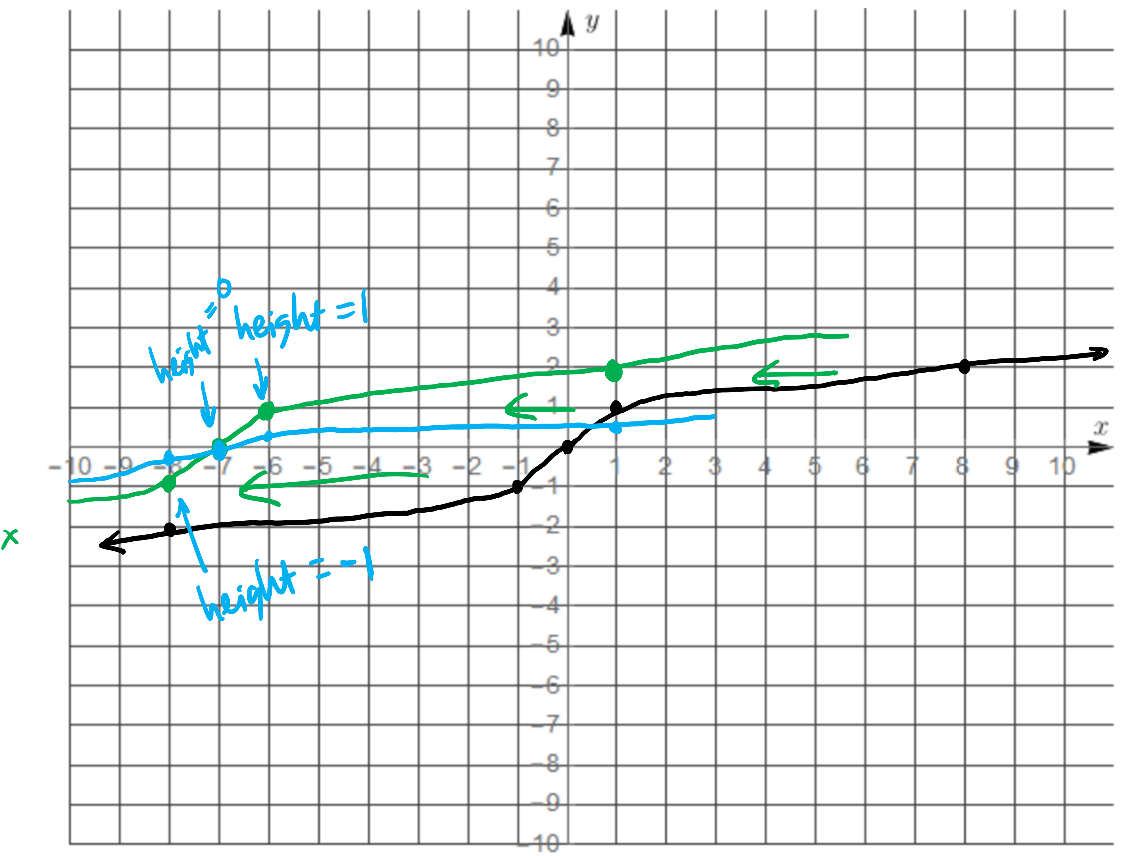
$h(x) = \frac{1}{3}\sqrt[3]{x+7}$

2nd: vertical shrink

1st: horizontal left by 7

1. What does the original graph look like?

2. What transformations have been done?

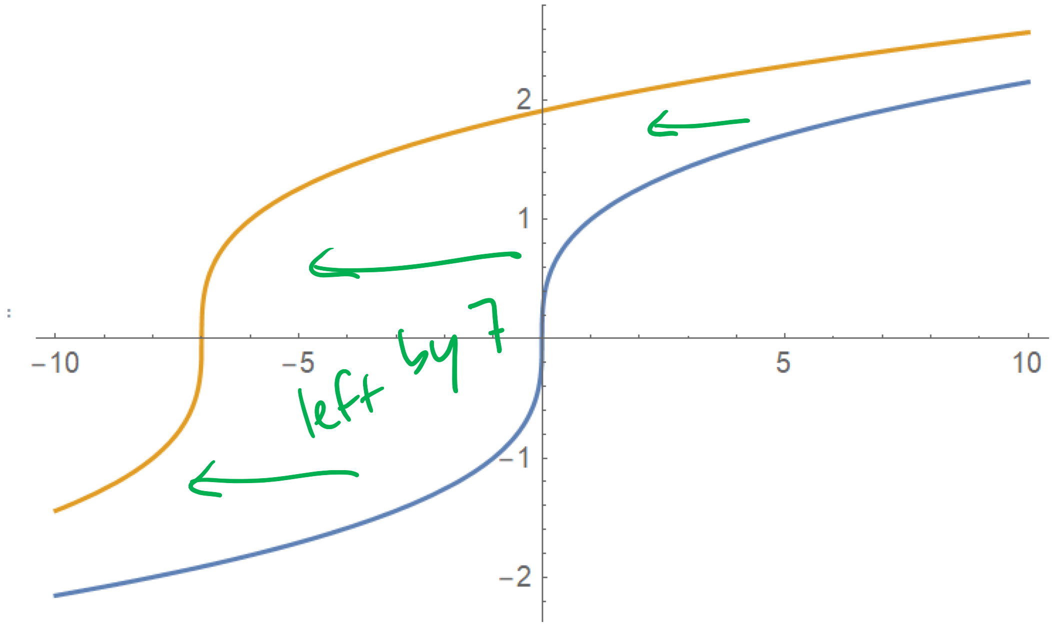


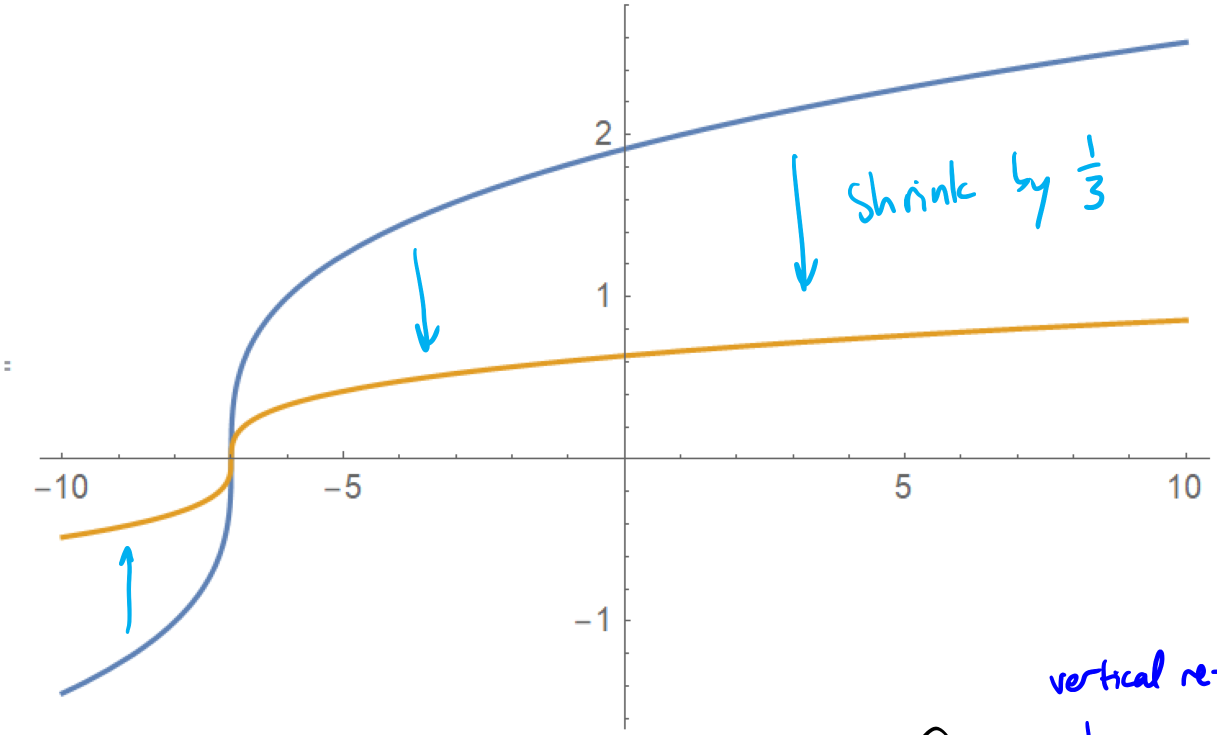
original: $f(x)=\sqrt[3]{x}$

$2\left(\frac{1}{3}\right)=\frac{2}{3}=.67$

$1\left(\frac{1}{3}\right)=\frac{1}{3}=.33$

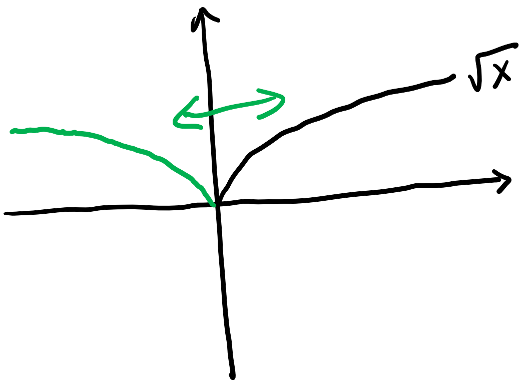
$-1\left(\frac{1}{3}\right)=-\frac{1}{3}=-.33$





$f(x) = \sqrt{-x}$

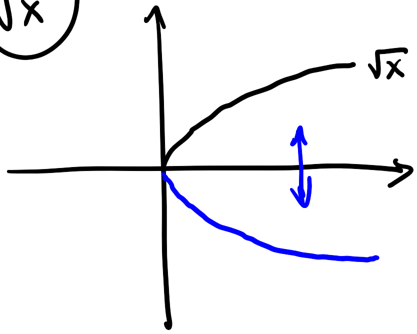
horizontal reflection



vertical reflection

$f(x) = -\sqrt{x}$

$y = -\boxed{\sqrt{x}}$



Write the statement as an equation. Then solve the equation for $\overset{n}{\cancel{s}}$. Use k as the constant of variation.

t ~~h~~ varies jointly as $\overset{h}{\cancel{p}}$ and the sum of $\overset{n}{\cancel{s}}$ and $\overset{f}{\cancel{r}}$.

Write the statement as an equation. Use k as the constant of variation.

t ~~h~~ = ☐

$\boxed{t = kh(n+f)}$

Solve the equation for s.

n ~~s~~ = ☐

$$\frac{t}{kh} = \frac{\cancel{kh}(n+f)}{\cancel{kh}}$$

$$\frac{t}{kh} = n + f$$
$$-f \qquad -f$$

$$\frac{t}{kh} - f = n$$

$$f - \frac{t}{kh} = n$$

2 − 5

5 − 2

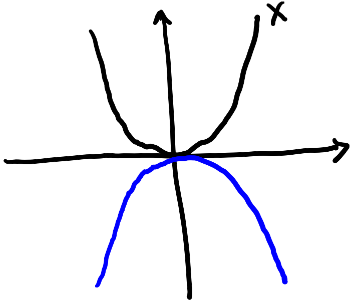
Use transformations of the graph of f(x) = x^2 to determine the graph of the given function.

$h(x) = -(x\cancel{-5})^2$

$-\boxed{(x)^2}$ or $(\underbrace{-x}_{})^2$

whole function ↓ y → vertical

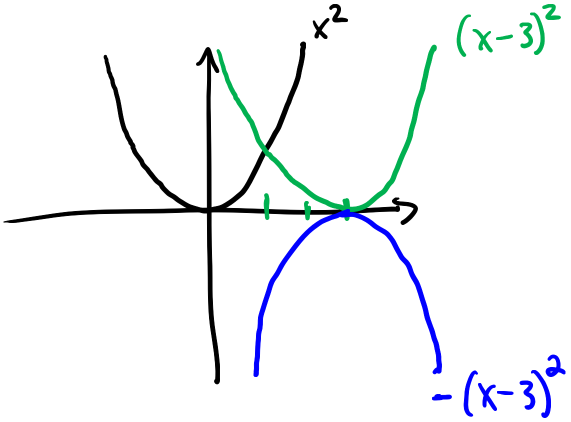
just x → horizontal



$h(x) = (x-3)^2$

2nd: negative

1st: right by 3



Test: Exam #2 Review (Optional)

Evaluate the piecewise function at the given values of the independent variable.

$$g(x) = \begin{cases} x+4 & \text{if } x \geq -4 \\ -(x+4) & \text{if } x < -4 \end{cases}$$

(a) g(0) (b) g(− 6) (c) g(2)

(a) g(0) = ☐

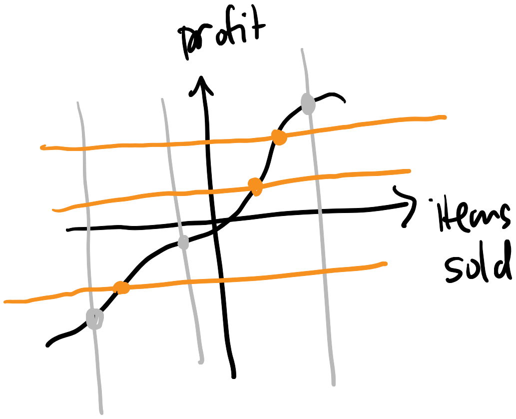
(b) g(− 6) = ☐

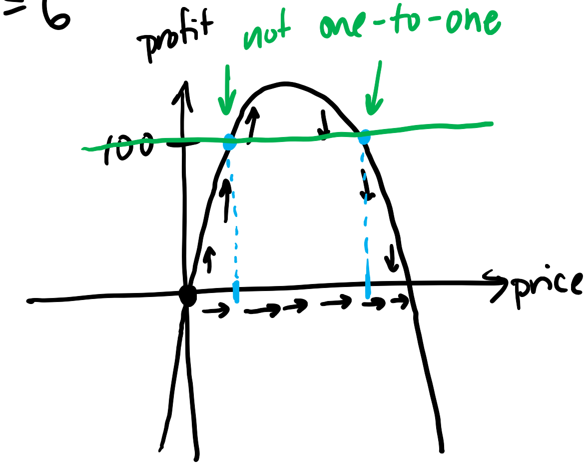
(c) g(2) = ☐

$$a)\ g(\underset{\substack{\uparrow \\ x=0}}{0}) = \overset{0}{\cancel{x}}+4 = 4$$

$$b)\ g(\underset{\substack{\uparrow \\ x=-6}}{-6}) = -(\overset{-6}{\cancel{x}}+4) = -(-2) = 2$$

$$c)\ g(2) = 2+4 = 6$$





The function f(x) = $(x+8)^3$ is one-to-one.

Find an equation for $f^{-1}(x)$, the inverse function.

$f^{-1}(x) =$ ☐

(Type an expression for the inverse. Use integers or fractions for any number in the expression.)

$$y = (x+8)^3$$

$$\sqrt[3]{x} = \cancel{\sqrt[3]{}}(y+8)^{\cancel{3}}$$

$$\text{ex. } x = 3y + \cancel{8}$$
$$\underline{-8 \qquad \cancel{-8}}$$

$\sqrt[3]{x} = y+8$

$\sqrt[3]{x} - 8 = y$

$\sqrt[3]{x} - 8 = f^{-1}(x)$

ex.

$y = (x+5)^5 + 6$

$x = (y+5)^5 + \cancel{6}$

$-6 \qquad -\cancel{6}$

$\sqrt[5]{x-6} = \sqrt[\cancel{5}]{(y+5)^{\cancel{5}}}$

$\sqrt[5]{x-6} = y+\cancel{5}$

$-5 \qquad -\cancel{5}$

$\sqrt[5]{y-6} - 5 = \cancel{y}\ f^{-1}(x)$

$\frac{x-8}{3} = \frac{\cancel{3}y}{\cancel{3}}$

$\frac{x-8}{3} = f^{-1}(x)$