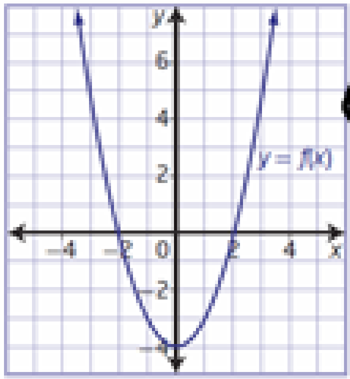
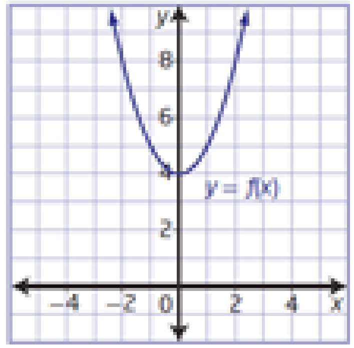
3. Match each graph of $y = f(x)$ to the corresponding graph of $y = \sqrt{f(x)}$.

a)



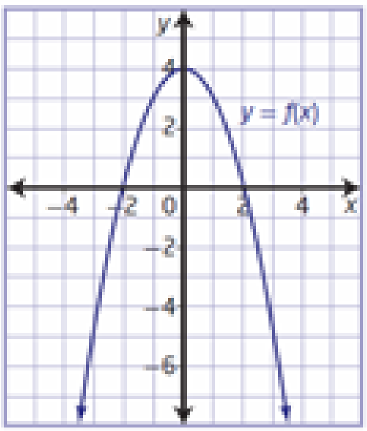
C

c)



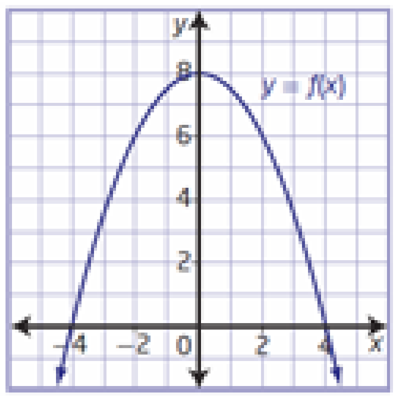
A

b)



D

d)



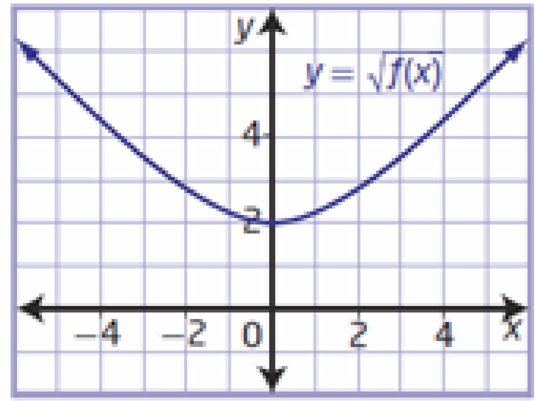
B

$\sqrt{8} = 2\sqrt{2}$

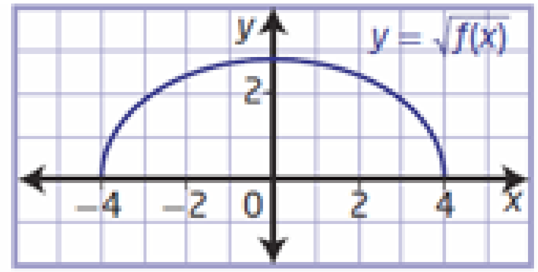
$= 2(1.4142)$

$=$

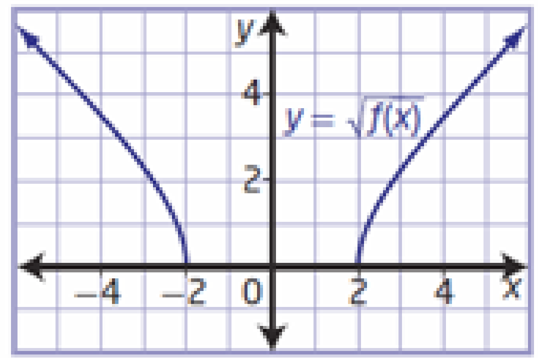
A



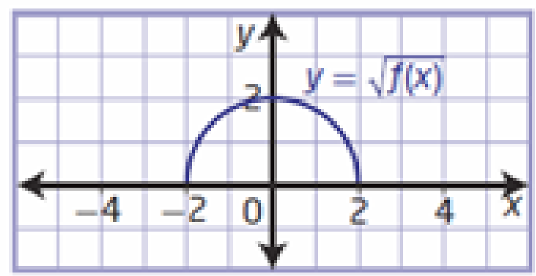
B



C

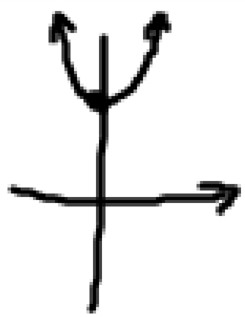


D



6. Identify and compare the domains and ranges of the functions in each pair.

c) $y = x^2 + 6$ and $y = \sqrt{x^2 + 6}$



$D: \{x \mid x \in R\}$

$R: \{y \mid y \geq 6\}$

minimum

$D: \{x \mid x \in R\}$

$R: \{y \mid y \geq \sqrt{6}\}$

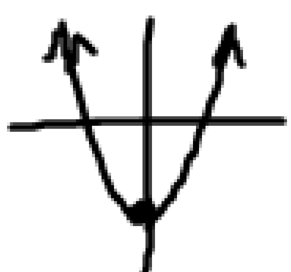
10. **a)** Identify the domains and ranges of $y = x^2 - 4$ and $y = \sqrt{x^2 - 4}$.

b) Why is $y = \sqrt{x^2 - 4}$ undefined over an interval? How does this affect the domain of the function?

$y = x^2 - 4$

$D: \{x \mid x \in R\}$

$R: \{y \mid y \geq -4\}$



x-int: $y = 0$

$0 = x^2 - 4$

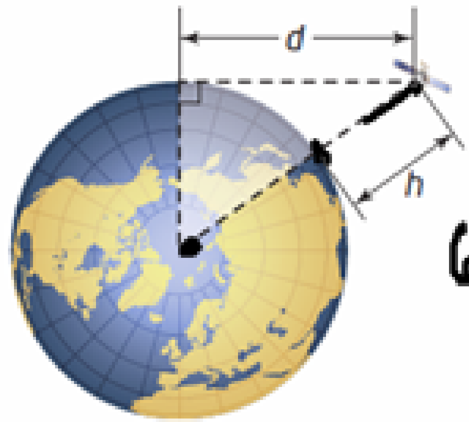
$y = \sqrt{x^2 - 4}$

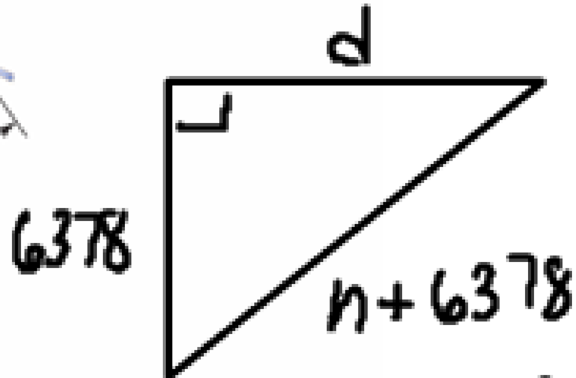
$D: \{x \mid x \leq -2 \text{ and } x \geq 2\}$

$R: \{y \mid y \geq 0\}$

B) We can't square root a negative # and $y = x^2 - 4$ has negative y values from $-2 \leq x \leq 2$.

12. For relatively small heights above Earth, a simple radical function can be used to approximate the distance to the horizon.





a) If Earth's radius is assumed to be 6378 km, determine the equation for the distance, d, in kilometres, to the horizon for an object that is at a height of h kilometres above Earth's surface.

Pythagorean Thm

$$a^2+b^2=c^2$$

$$d^2+(6378)^2=(h+6378)^2$$

$$d^2=(h+6378)^2-(6378)^2$$

$$d^2=h^2+2(6378)h+\cancel{(6378)^2}-\cancel{(6378)^2}$$

$$d^2=h^2+12756h$$

$$d=\pm\sqrt{h^2+12756h}$$

* Don't need ± because we don't have negative distances.

$$d=\sqrt{h^2+12756h}$$

b) Identify the domain and range of the function.

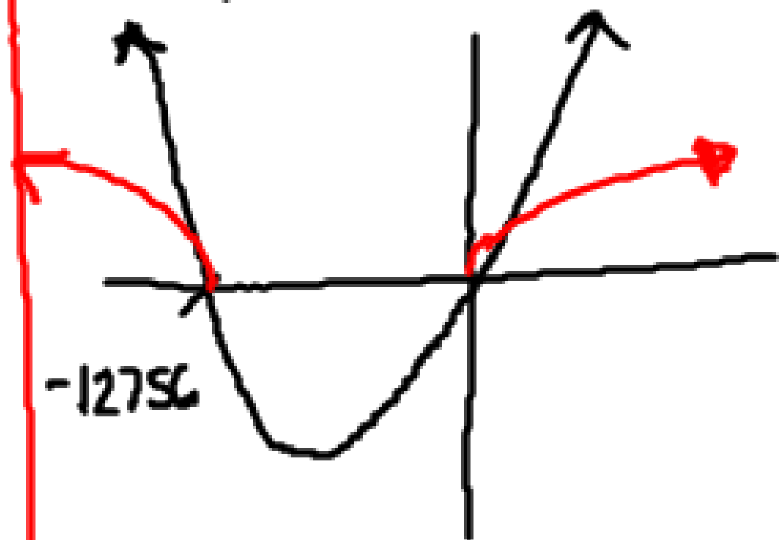
$d = \sqrt{h^2 + 12756h}$

$D: \{h \mid h \geq 0\}$

$R: \{d \mid d \geq 0\}$

$d = \sqrt{h(h+12756)}$

$y = h^2 + 12756h$



$D: \{h \mid h \leq -12756 \text{ and } h \geq 0\}$

c) How can you use a graph of the function to find the distance to the horizon for a satellite that is 800 km above Earth's surface?

d) If the function from part a) were just an arbitrary mathematical function rather than in this context, would the domain or range be any different? Explain.

Range doesn't change.

$$y = x^2 + 4x$$

$$0 = x^2 + 4x$$

$$= x(x+4)$$

$x = 0$ $\quad$ $x + 4 = 0$

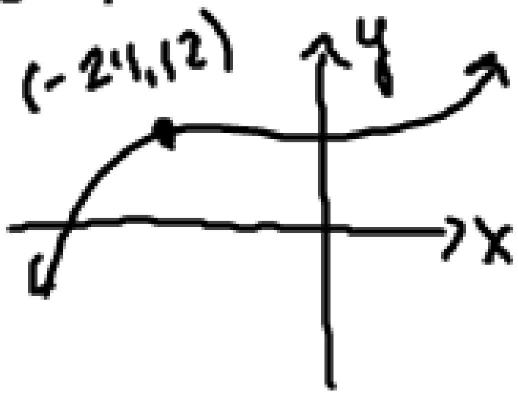
$x = -4$

Extend

16. If $(-24, 12)$ is a point on the graph of the function $y = f(x)$, identify one point on the graph of each of the following functions.

a) $y = \sqrt{4f(x + 3)}$

graph of $f(x)$:



Apply trans to $f(x)$

$y = 4f(x+3)$

VS 4 HT -3)

the new coord pt:

$(x, y) \rightarrow (x-3, 4y)$

$(-24, 12) \rightarrow (-27, 48)$

→ Now square root all the y-values of the function

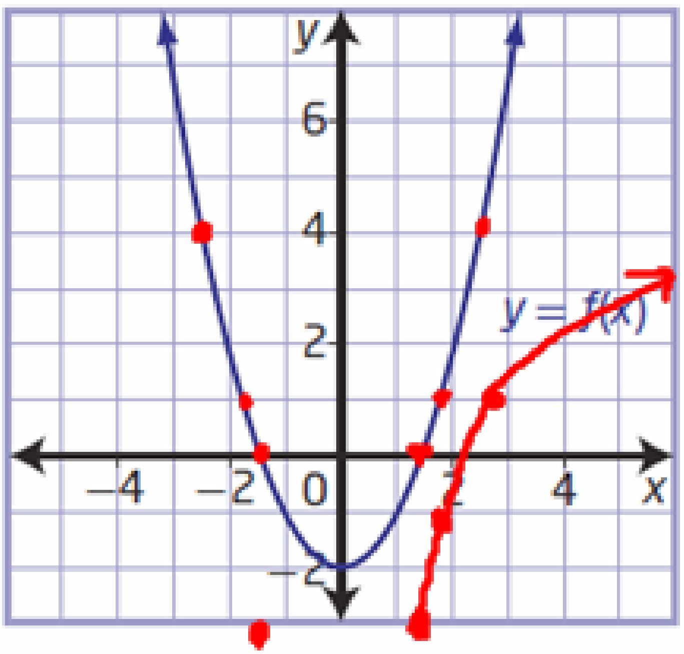
$(x, y) \rightarrow (x, \sqrt{y})$

$(-27, 48) \rightarrow (-27, \sqrt{48})$

(Mapping Rule:

$(x, y) \rightarrow (x-3, \sqrt{4y})$)

17. Given the graph of the function $y = f(x)$, sketch the graph of each function.



a) $y = 2\sqrt{f(x)} - 3$

→ Take the squareroot of the y values, then apply trans...

MR: $(x, y) \to (x, 2\sqrt{y} - 3)$

$(1.5, 0) \to (1.5, -3)$

$(1.8, 1) \to (1.8, -1)$

Yummy

HW: pg 87 #9-14, 16-19