16. Determine the equation of a radical function with

a) endpoint at (2, 5) and passing through the point (6, 1)

b) endpoint at (3, −2) and an x-intercept with a value of −6

11. Write the equation of a radical function with each domain and range.

a) $\{x \mid x \geq 6, x \in \mathrm{R}\}, \{y \mid y \geq 1, y \in \mathrm{R}\}$

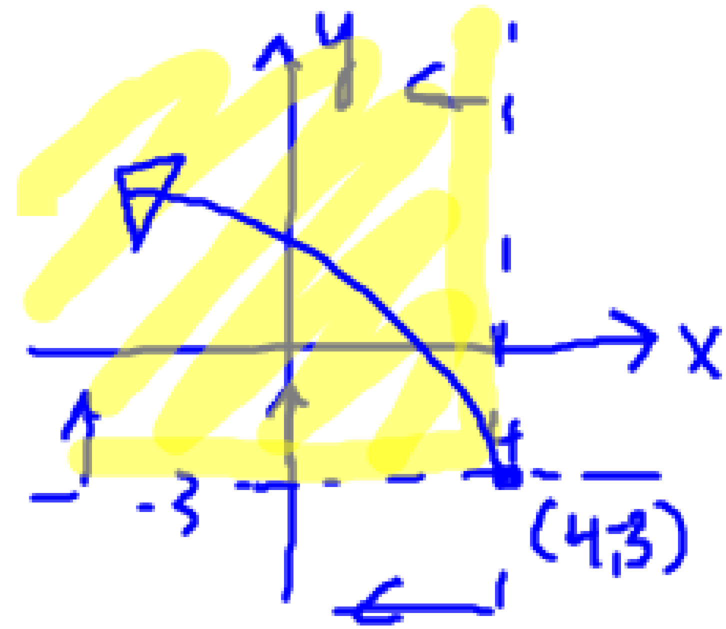
b) $\{x \mid x \geq -7, x \in \mathrm{R}\}, \{y \mid y \leq -9, y \in \mathrm{R}\}$

c) $\{x \mid x \leq 4, x \in \mathrm{R}\}, \{y \mid y \geq -3, y \in \mathrm{R}\}$

d) $\{x \mid x \leq -5, x \in \mathrm{R}\}, \{y \mid y \leq 8, y \in \mathrm{R}\}$

HT+4, VT-3, R_y

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



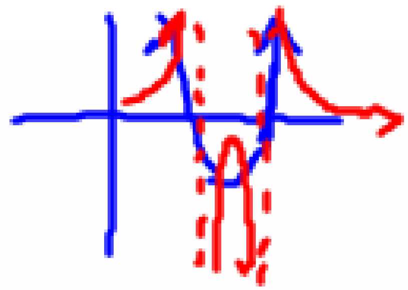
20. If $f(x) = \frac{5}{8}\sqrt{-\frac{7}{12}x}$ and $g(x) = -\frac{2}{5}\sqrt{6(x+3)} - 4$, what transformations could you apply to the graph of $f(x)$ to create the graph of $g(x)$?

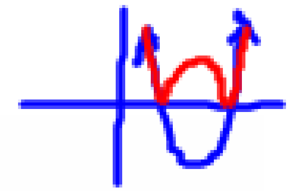
← transformation of $y = \sqrt{x}$

$f(x) \rightarrow g(x)$

f(x)	g(x)
VS	VS
VT	VT
R_x	R_x
HS	HS
HT	HT
R_y	R_y

11PC → $y = f(x)$ $\quad y = |f(x)|$





$y = \dfrac{1}{f(x)}$

2.2

Square Root of a Function

Focus on...

- sketching the graph of $y = \sqrt{f(x)}$ given the graph of $y = f(x)$
- explaining strategies for graphing $y = \sqrt{f(x)}$ given the graph of $y = f(x)$
- comparing the domains and ranges of the functions $y = f(x)$ and $y = \sqrt{f(x)}$, and explaining any differences

Compare the following graphs with the graph of the square root of the function. List any invariant points and give the domain and range for each graph.

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

Use a table of values (**SOMETIMES** it is easier to pick values of y that are perfect squares and solve for x...like for linear functions).

$y = 2x - 3$

$y + 3 = 2x$

$x = \frac{1}{2}(y+3)$

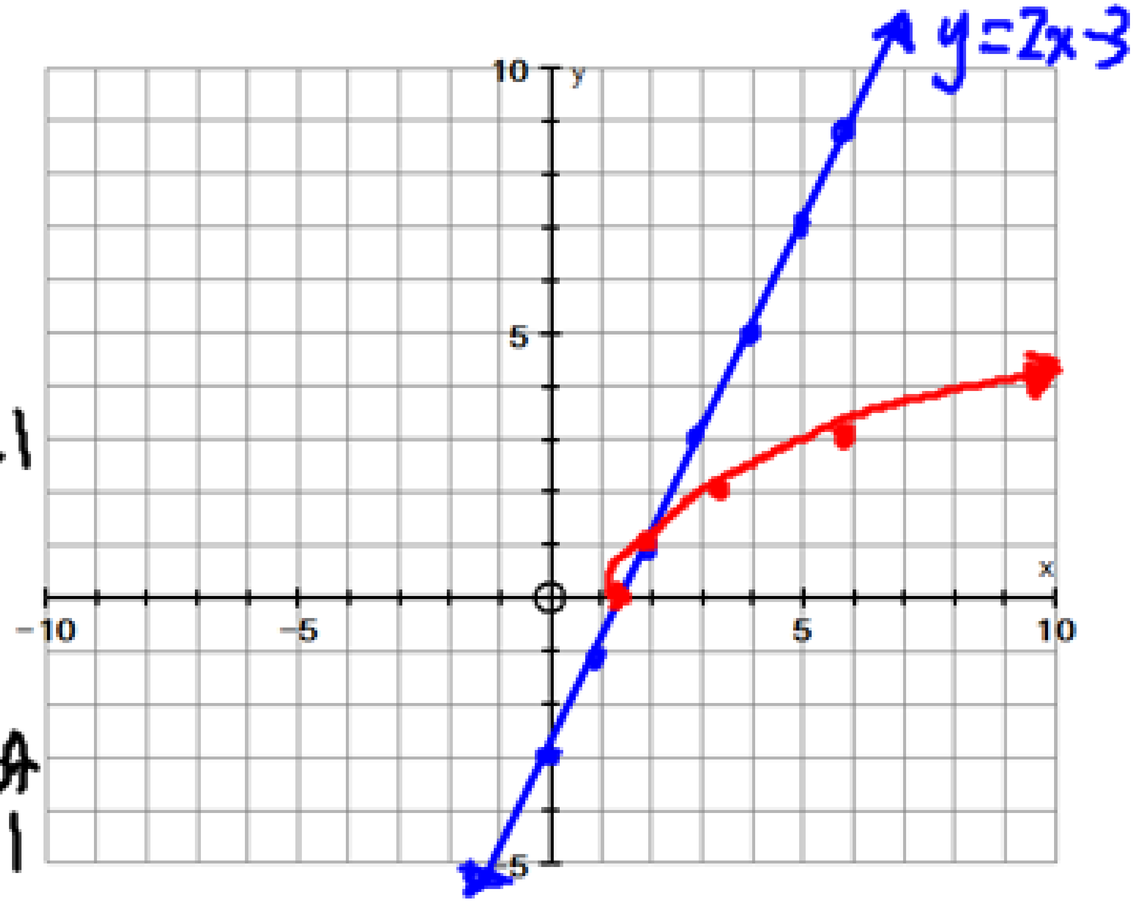
x	$y = 2x - 3$	$y = \sqrt{2x-3}$
$\frac{3}{2}$ or 1.5	0	0
2	1	1
3.5	4	2
6	9	3
9.5	16	4
14	25	5

$y = 2x - 3$

$y = \sqrt{2x-3}$

Invariant pts $y=0$ and $y=1$

$\sqrt{\frac{1}{4}} = \frac{1}{2}$, $\sqrt{\frac{1}{9}} = \frac{1}{3}$, $\sqrt{\frac{1}{100}} = \frac{1}{10}$



- When we take the square root of a number between 0 and 1 the result is larger $\sqrt{\frac{1}{4}} = \frac{1}{2}$
- the graph of the square root of a function will always be greater than or equal to $y=0$

(b) $y = -x^2 + 4$ and $y = \sqrt{-x^2 + 4}$

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

Sketch $y = -x^2 + 4$ first. What are the key points?

x-int (y=0): (-2,0) and (2,0)

y-int (x=0) : (0,4)

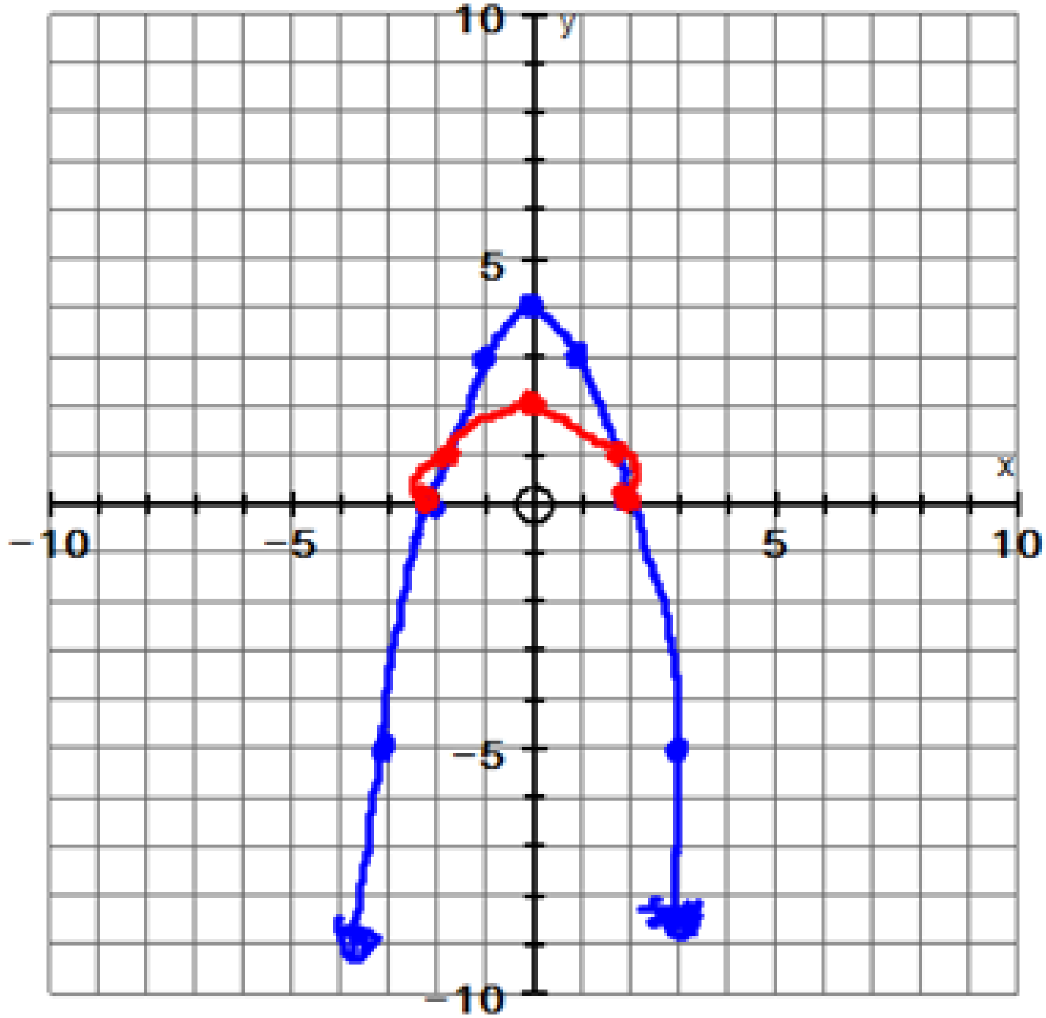
vertex (0,4)

Invariant pts y=0 , y=1

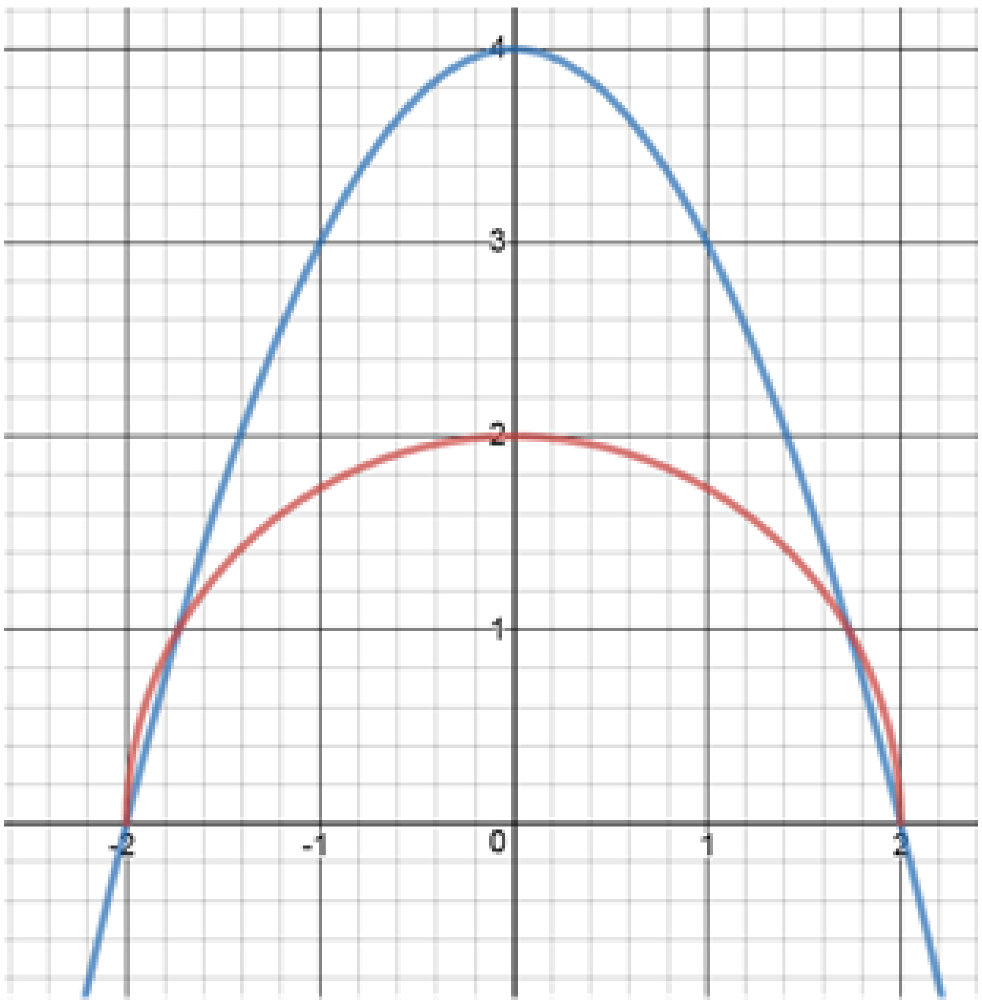
$y = \sqrt{-x^2+4}$

$D: \{x \mid -2 \le x \le 2\}$

$R: \{y \mid 0 \le y \le 2\}$



Function	$y=-x^2+4$	$y=\sqrt{-x^2+4}$
x-intercepts	(-2,0) (2,0)	(-2,0) (2,0)
y-intercept	(0,4)	(0,2)
Maximum Value	y=4	y=2
Minimum Value	None	y=0



The domain of $y = \sqrt{f(x)}$ consists only of the values in the domain of $f(x)$ for which $f(x) \geq 0$.

The range of $y = \sqrt{f(x)}$ consists only of the square roots of the values in the range of $y = f(x)$ for which $\sqrt{f(x)}$ is defined.

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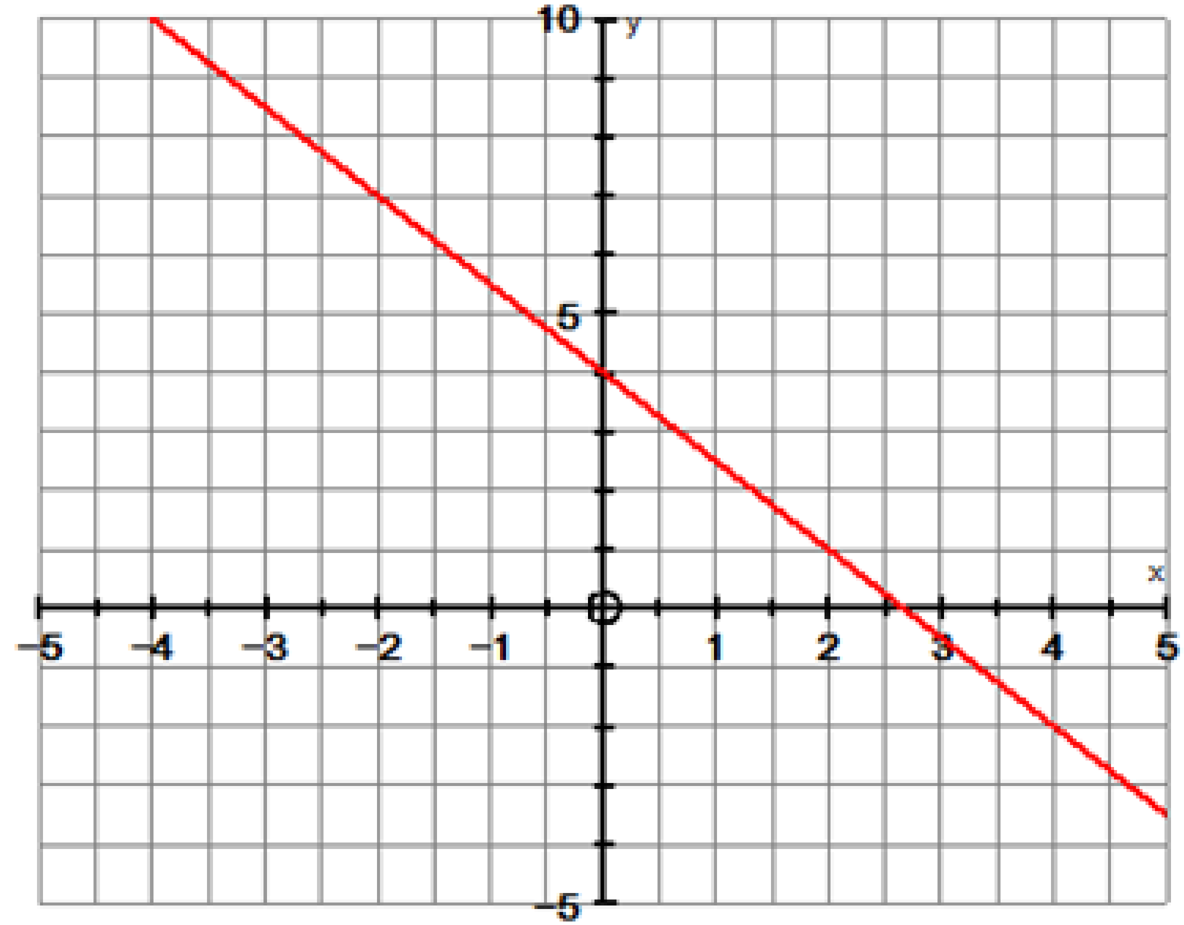
Value of $f(x)$	$f(x) < 0$	$f(x) = 0$	$0 < f(x) < 1$	$f(x) = 1$	$f(x) > 1$
Relative Location of Graph of $y = \sqrt{f(x)}$	The graph of $y = \sqrt{f(x)}$ is undefined.	The graphs of $y = \sqrt{f(x)}$ and $y = f(x)$ intersect on the x-axis.	The graph of $y = \sqrt{f(x)}$ is above the graph of $y = f(x)$.	The graph of $y = \sqrt{f(x)}$ intersects the graph of $y = f(x)$.	The graph of $y = \sqrt{f(x)}$ is below the graph of $y = f(x)$.

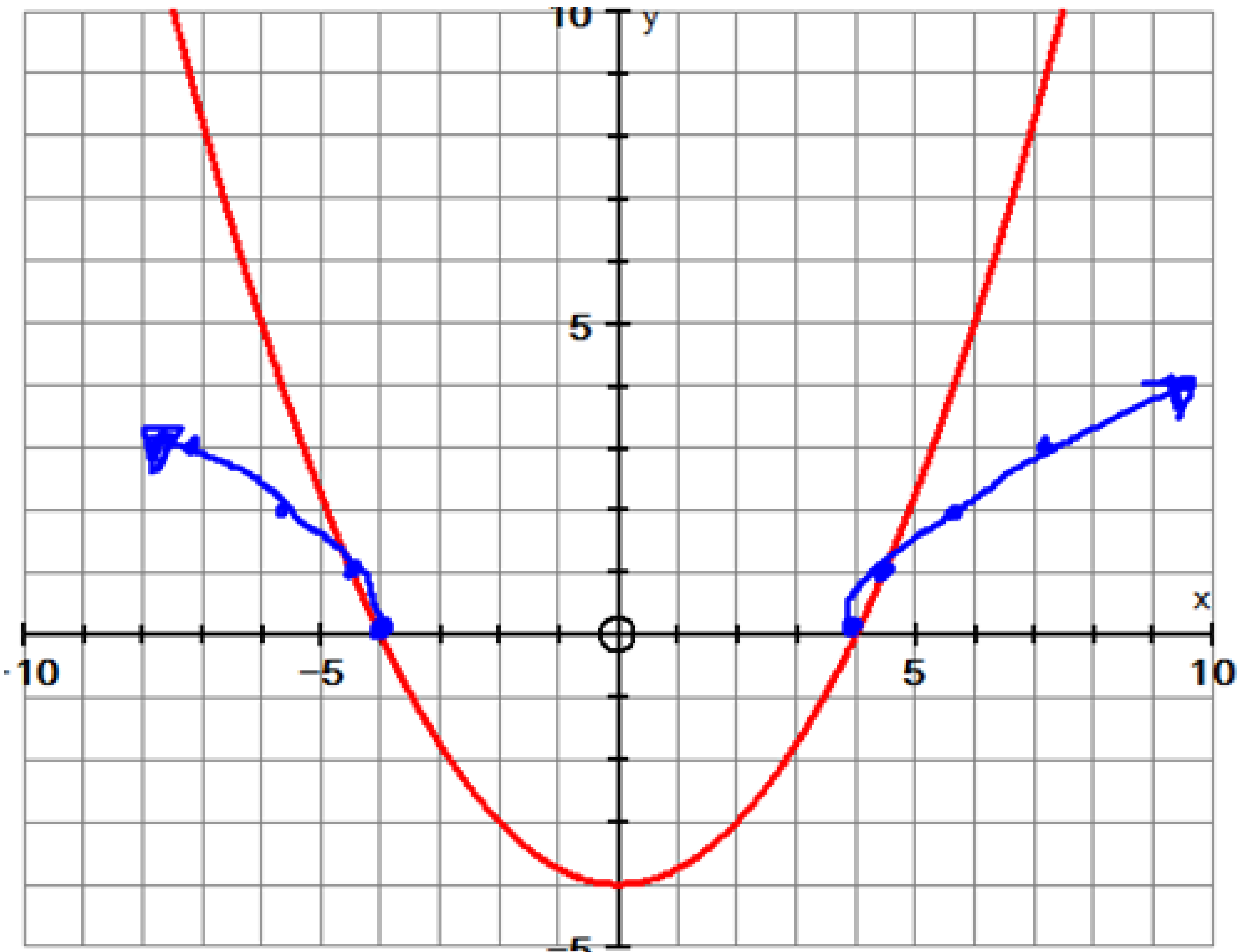
Use the following graphs of $y = f(x)$ to sketch the square root of the original functions, $y = \sqrt{f(x)}$.

Step 1: Graph invariant points first.

Step 2: Draw the portion of the graph that is between the invariant points for values of $y = f(x)$ that are positive but less than 1. Sketch a smooth curve **above** that of $y = f(x)$ in this interval.

Step 3: Locate other key points on $y = f(x)$ where the values are greater than 1. Transform these points, $y = \sqrt{f(x)}$.


10
y
5
x
−5
−4
−3
−2
−1
0
1
2
3
4
5
−5



D: $x \in (-\infty, -4] \cup [4, \infty)$ $\{x \mid x \leq 4 \text{ and } x \geq 4\}$

HW: pg 86 #1-8