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

Inside a Square Root

Quantity $x \geq 0$

$y = \sqrt{x-1}$ $x - 1 \geq 0$

$x \geq 1$ $\therefore$ $[1, \infty)$
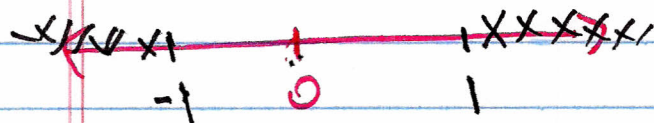
$y = \sqrt{x^2 - 1}$

$x^2 - 1 \geq 0$

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

Distance from zero $|x| \geq 1$

Domain $(-\infty, -1] \cup [1, \infty)$

$x \leq -1$ or $x \geq 1$

$x^2 - 1 \geq 0$
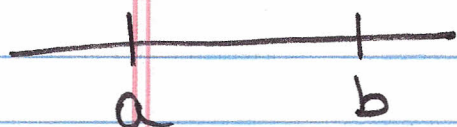
$(x-1)(x+1) \geq 0$

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

$$x^2 - 2 \geq 0 \quad \text{Start}$$

$$x^2 \geq 2$$

a   b

distance
b-a

$$|x| \geq \sqrt{2}$$

$-\sqrt{2}$ 0 $\sqrt{2}$
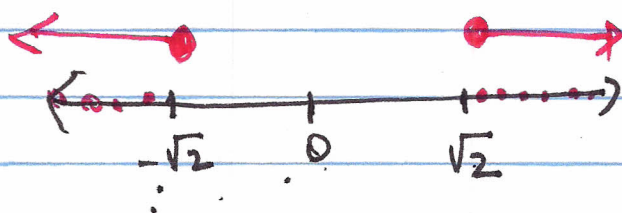
Domain $(-\infty, -\sqrt{2}\,] \cup [\,\sqrt{2}, \infty)$

$$y = \sqrt{1 - x^2}$$

$$1 - x^2 \geq 0$$
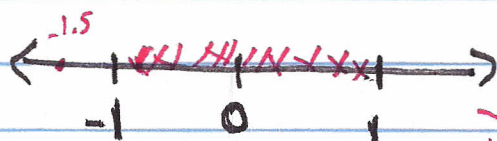
$$-1(1 - x^2 \geq 0)$$

$$x^2 - 1 \leq 0$$
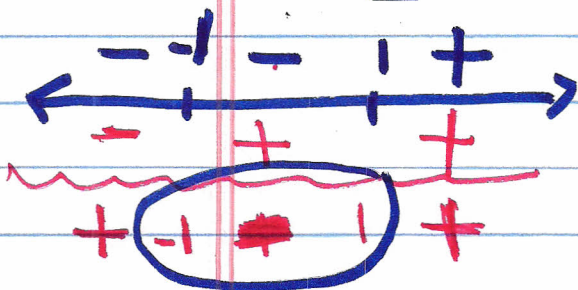
$$(x-1)(x+1) \leq 0$$

$$1 \geq x^2$$

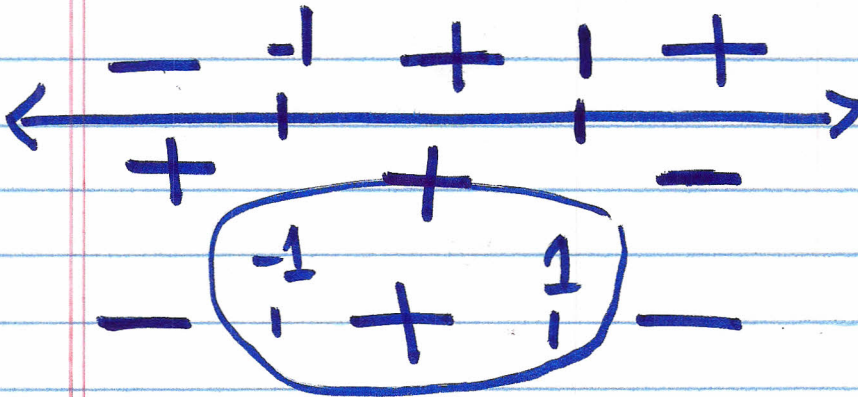$$1 \geq |x| \quad \text{the Same as}$$

$$|x| \leq 1$$

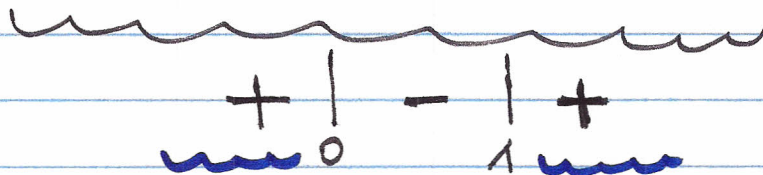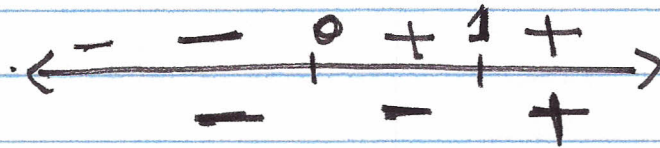$$-1 \leq x \leq 1$$

Domain $[-1, 1]$

$$1 - x^2 \geq 0$$

$$(1+x)(1-x) \geq 0$$

$$
\begin{array}{c}
\overset{-}{\underset{+}{}} \quad \overset{-1}{} \quad \overset{+}{\underset{+}{}} \quad \overset{1}{} \quad \overset{+}{\underset{-}{}}
\end{array}
$$

$$
\begin{array}{c}
- \quad \underset{-1}{} \quad + \quad \underset{1}{} \quad -
\end{array}
$$

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

$$x^2 - x \geq 0$$

$$x(x-1) \geq 0$$

$$
\begin{array}{c}
\overset{-}{\underset{-}{}} \quad \overset{0}{} \quad \overset{+}{\underset{-}{}} \quad \overset{1}{} \quad \overset{+}{\underset{+}{}}
\end{array}
$$

$$
\begin{array}{c}
+ \quad \underset{0}{} \quad - \quad \underset{1}{} \quad +
\end{array}
$$

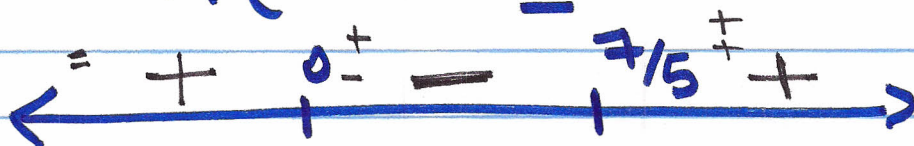Domain $(-\infty, 0] \cup [1, \infty)$

$$f(x) = \sqrt{5x^2 - 7x} \qquad f(2x) = \sqrt{5(2x)^2 - 7(2x)}$$

$$= \sqrt{20x^2 - 14x} \checkmark$$

Domain of $f(x)$

Critical points
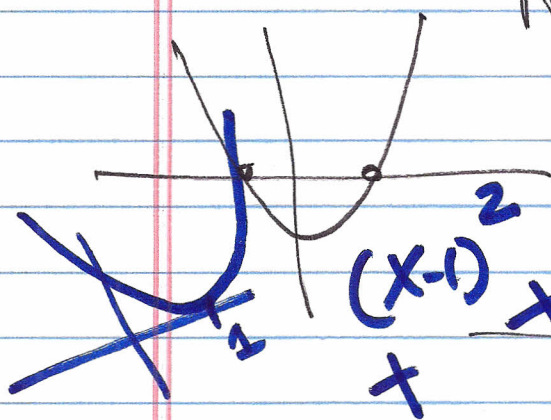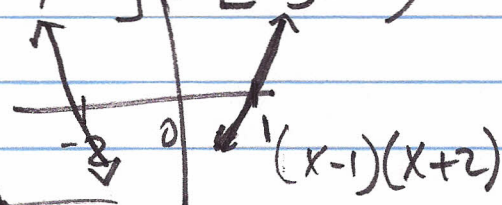
$$5x^2 - 7x \geq 0$$

$$x(5x - 7) \geq 0 \checkmark$$

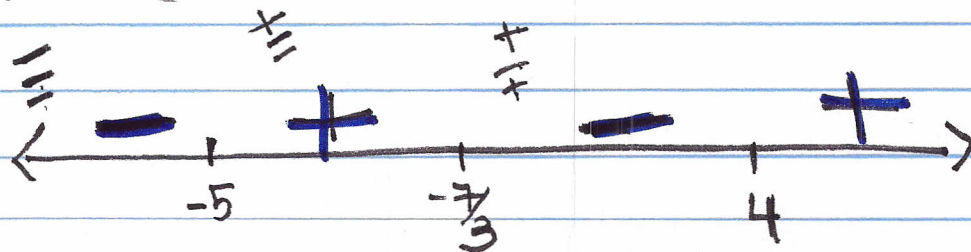Answer Domain of $f(x)$

$$(-\infty, 0] \cup [7/5, \infty).$$

$(x-1)^2$ x

$+$

$(x-1)(x+2)$

-5
4
-7/3

$$(x+5)(x-4)'(3x+7)' < 0$$

-5   -7/3   4

Solution $(-\infty, -5) \cup (-7/3, 4)$