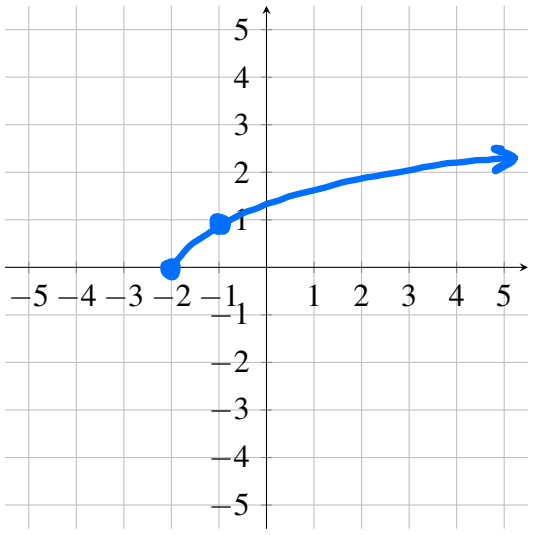
Name: Solutions _____ / 16

No aids (calculator, notes, text, etc.) are permitted. Show all work for full credit and box your final answer.

1. [4 points]

a. State the **domain** and **range** of the following function $f(x) = \sqrt{x+2}$. **Sketch a graph** of the given function below.



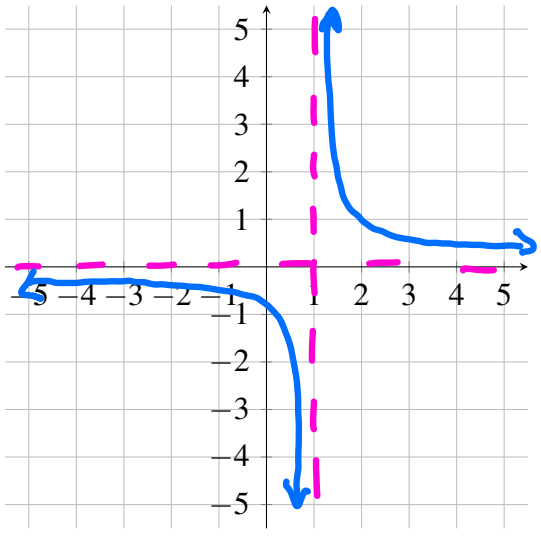
$f(x) = \sqrt{x+2}$

$x+2 \geq 0 \Rightarrow x \geq -2$

$\text{Dom}(f) = [-2, \infty)$

$\text{Ran}(f) = [0, \infty)$

b. State the **domain** and **range** of the following function $f(x) = \dfrac{1}{x-1}$. **Sketch a graph** of the given function below.



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

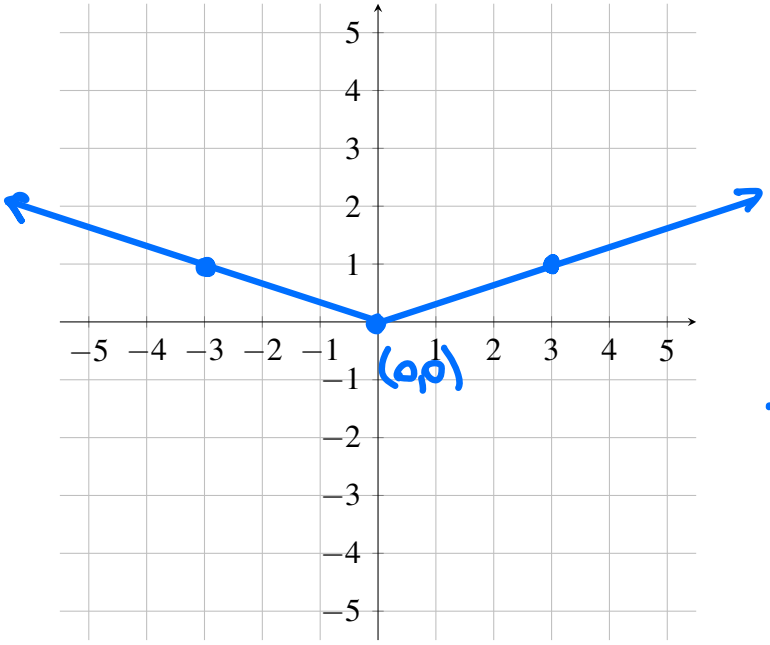
$x-1 \neq 0 \Rightarrow x \neq 1$

$\text{Dom}(f) = \mathbb{R} \setminus \{1\}$

$\text{Ran}(f) = \mathbb{R} \setminus \{0\}$

2. [6 points] Sketch the graphs of the following functions. **Indicate (mark on your graph)** intercept points.

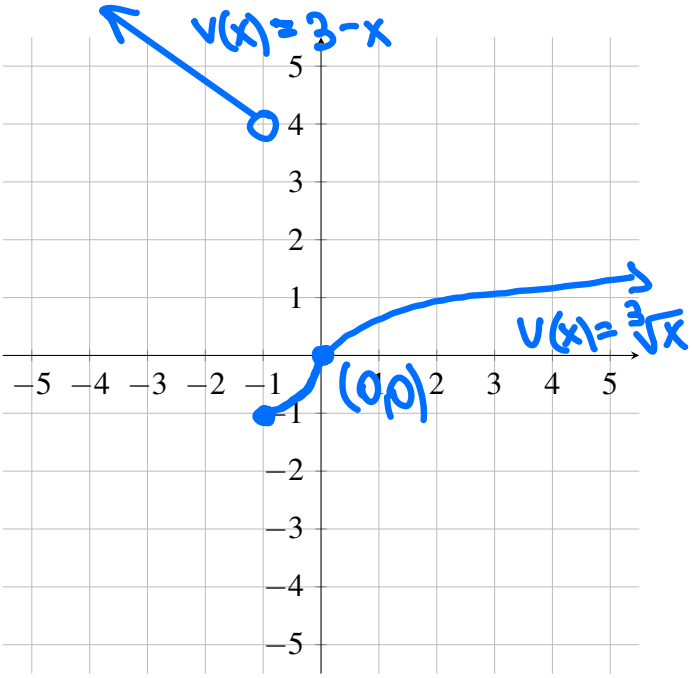
a. $g(x) = \dfrac{|x|}{3}$



x	g(x)
0	0
3	1
-3	1

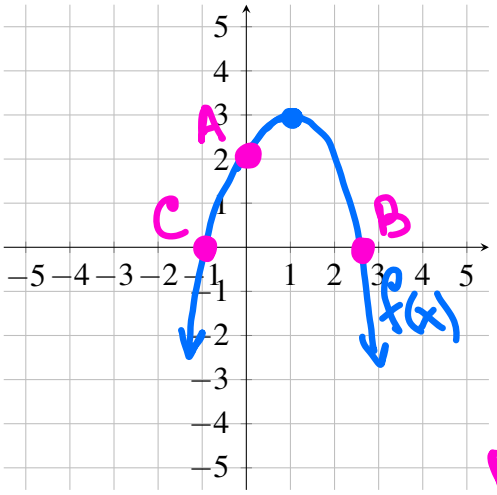
x- and y- intercept is (0,0)

b. $v(x) = \begin{cases} 3-x, & x < -1, \\ \sqrt[3]{x}, & x \geq -1 \end{cases}$



3. [4 points]

a. Sketch the following function $f(x) = -(x-1)^2 + 3$. **Indicate (mark on your graph)** intercept points.



y- intercept: A(0,2)

$x = 0$, $y = 2$

x- intercept:

$y = 0 \Rightarrow (x-1)^2 = 3$

$x - 1 = \pm\sqrt{3}$

$x = \pm\sqrt{3} + 1$

$B(\sqrt{3}+1, 0)$ and $C(-\sqrt{3}+1, 0)$

b. Determine the basic function that has been shifted, reflected, stretched, or compressed.

$f(x) = x^2$

4. [2 points] **Write a formula** for the function described below.

Use the function $f(x) = x^3$. Compress the function horizontally by a factor 3 and move it 1 unit down.

- Compression by a factor 3 horizontally:

  $f(x) = (3x)^3$

- Shifting down by 1:

  $f(x) = (3x)^3 - 1$