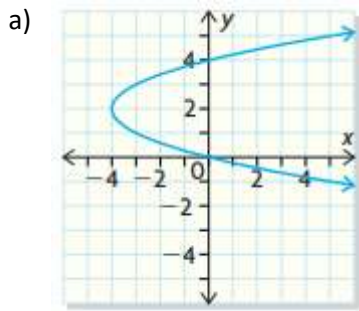


1. a) State the definition of a function. (*this *is* on your test or exam*)

know this definition

2. State whether each is a function or just a relation. Justify your answer with proper reasoning.



Not a f
(it fails the V.L.T.)

b) $\{(-4, 8), (-2, 7), (0, 3), (4, -2), (5, 10)\}$

This is a function
(a discrete function in this case)
because every domain value
is only assigned to one range
value.

3. Let $f(x) = 3x + 5$ and $g(x) = -2x^2 - 3x + 8$.

a) Evaluate $f(2)$

$$\begin{aligned} f(2) &= 3(2) + 5 \\ &= 11 \end{aligned}$$

b) Find x so that $f(x) = -7$

$$\begin{aligned} -7 &= 3x + 5 \\ \Rightarrow -12 &= 3x \end{aligned} \Rightarrow x = -4$$

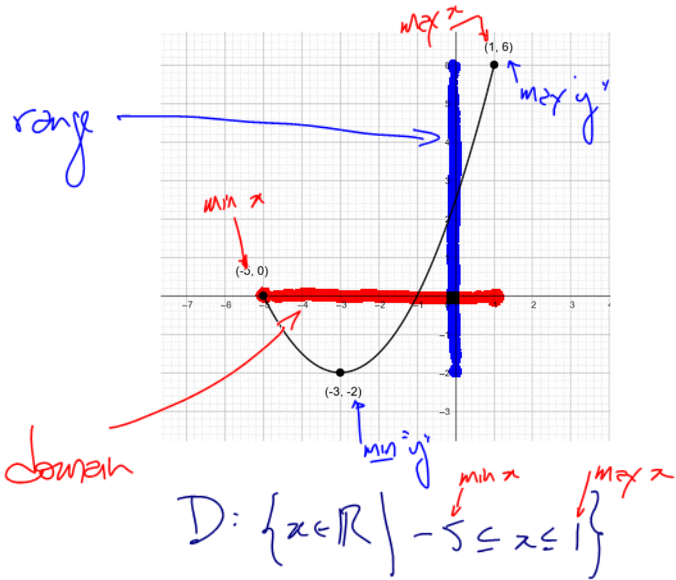
c) Evaluate $g(-3)$

$$\begin{aligned} g(-3) &= -2(-3)^2 - 3(-3) + 8 \\ &= -2(9) + 9 + 8 \\ &= -1 \end{aligned}$$

d) Evaluate $f(2) - g(-3)$

$$\begin{aligned} &= 11 - (-1) \\ &= 12. \end{aligned}$$

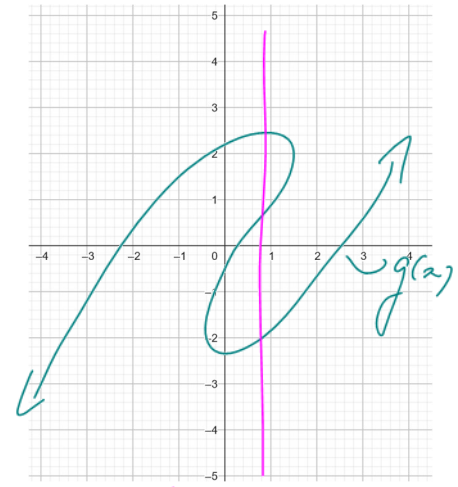
4. a) State the domain and range of the following relation:



$D: \{x \in \mathbb{R} \mid -5 \leq x \leq 1\}$

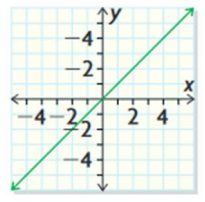
$R: \{y \in \mathbb{R} \mid -2 \leq y \leq 6\}$

b) Sketch a relation which is not a function

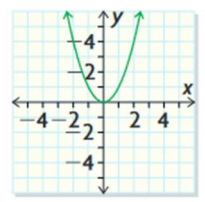


fails the V.L.T.

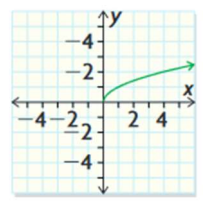
5. Under each sketch write the name the parent function type for each sketch:



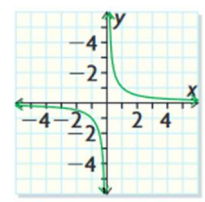
linear



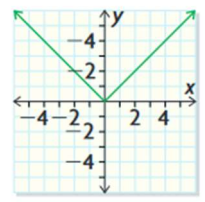
quadratic



square root



reciprocal



absolute value

6. Given the function $f(x) = |x|$, write the equation for a transformed function, $g(x)$, after the following transformations: (No sketch required - just the equation)

- horizontal stretch by the factor 3, $\rightarrow k = \frac{1}{3}$ inside the "11"
- vertical stretch by the factor 2 outside the "
- vertical flip around the x-axis vertical flip \Rightarrow outside the "11"
- Shift 5 units right and 4 units down

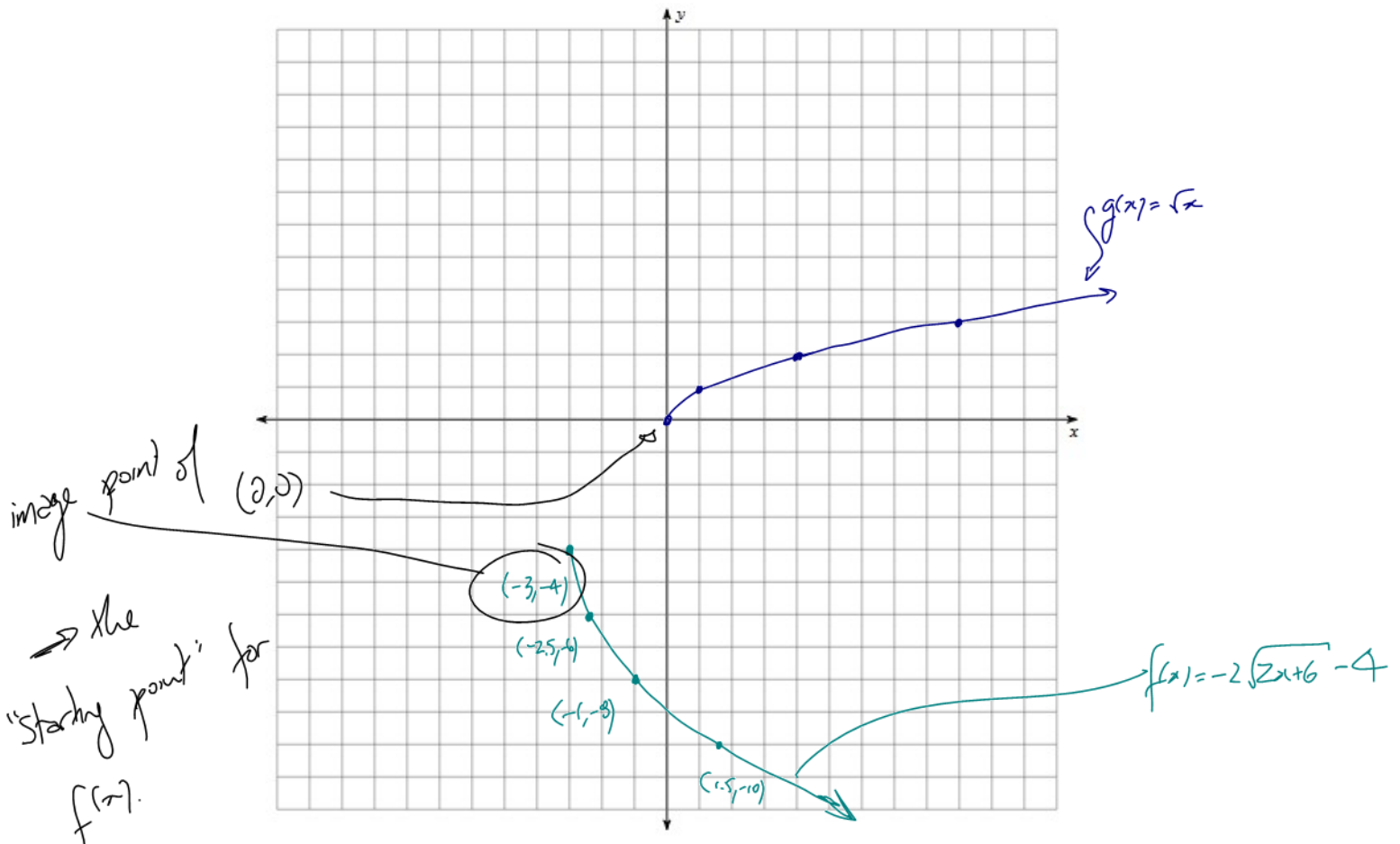
"-5" inside outside

$g(x) = -2 \left| \frac{1}{3}(x-5) \right| - 4$

7. Fill in the table below. If necessary, round to 1 decimal place.

Function	Proper Function $f(x) = a f(k(x-d)) + c$	Vertical Stretch a	Horizontal Stretch 1/k	Horizontal Shift d	Vertical Shift c
$f(x) = -2\sqrt{2x+6} - 4$	$f(x) = -2\sqrt{2(x+3)} - 4$	-2	$\frac{1}{2}$	-3	-4
Domain		Range		y-int (x=0)	
Table Of Values	Parent Function: $g(x) = \sqrt{x}$		Transformed Function		
	x_p	y	$x_T = \frac{1}{2}x_p - 3$	$f = -2g - 4$	
	0	0	-3	-4	
	1	1	-2.5	-6	
	4	2	-1	-8	
9	3	1.5	-10		

Graph both the parent function and the transformed function.



8. Given the graph (set of points) of the discrete function $g(x)$, state the inverse relation $g^{-1}(x)$. Is $g^{-1}(x)$ a function? Why or why not?

$$g(x) = \{(-2,3), (-1,2), (0,4), (1,3), (2,-5)\}$$

$$g^{-1}(x) = \{(3,-2), (2,-1), (4,0), (3,1), (-5,2)\}$$

$g^{-1}(x)$ is not a function because the domain value -3 is assigned to two range values ($-2 \neq 1$)

9. Determine the equation for the inverse relation. It is your choice whether you use Brute Force or Transformations.

$$f(x) = -3\sqrt{x-5} + 1$$

BRUTE FORCE

$$x = -3\sqrt{f^{-1}(x) - 5} + 1$$

$$\Rightarrow x - 1 = -3\sqrt{f^{-1}(x) - 5}$$

$$\Rightarrow \frac{x-1}{-3} = \sqrt{f^{-1}(x) - 5}$$

$$\Rightarrow \left(\frac{x-1}{-3}\right)^2 = f^{-1}(x) - 5$$

$$\Rightarrow f^{-1}(x) = \left(-\frac{1}{3}(x-1)\right)^2 + 5$$

$$f(x) = -3\sqrt{x-5} + 1$$

TRANSFORMATIONS

$$f^{-1}(x) = \left(-\frac{1}{3}(x-1)\right)^2 + 5$$