

Key 28

Name: \_\_\_\_\_

Block: \_\_\_\_\_

### Absolute Value and Reciprocal Functions Practice Test

1. Solve for  $x$  and validate your solution(s). Show ALL of your work and clearly indicate your accepted solution(s).

a)  $|x - 7| = 5$  (1/2)

+

$$x - 7 = 5$$

$$\boxed{x = 12}$$

$$\hookrightarrow |12 - 7| = 5 \\ |5| = 5 \checkmark$$

~  
-  $x + 7 = 5$

$$\boxed{x = 2}$$

$$\hookrightarrow |2 - 7| = 5 \\ |-5| = 5 \checkmark$$

b)  $|x| = |-x|$  (1/2)

$$x \in \mathbb{R}$$

c)  $x^2 - 4x + 6 = 3 - |x - 1|$

(1/4)

+

$$x^2 - 4x + 6 = 3 - (x - 1)$$

$$x^2 - 4x + 6 = 3 - x + 1$$

$$x^2 - 3x + 2 = 0$$

$$(x - 1)(x - 2) = 0$$

$$\boxed{x = 1, 2}$$

$$\hookrightarrow x = 1$$

$$1^2 - 4(1) + 6 = 3 - (1 - 1)$$

$$1 - 4 + 6 = 3$$

$$3 = 3 \checkmark$$

$$2^2 - 4(2) + 6 = 3 - |2 - 1|$$

$$4 - 8 + 6 = 3 - 1$$

$$2 = 2 \checkmark$$

$$(x^2 - 4x + 4) + 6 - 4$$

$$(x - 2)^2 + 2$$

$$x^2 - 4x + 6 = 3 + (x - 1)$$

$$x^2 - 4x + 6 = 3 + x - 1$$

$$x^2 - 5x + 4 = 0$$

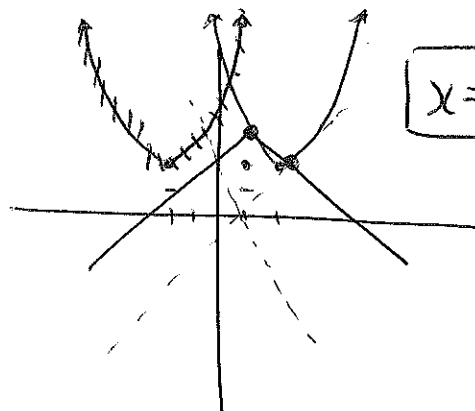
$$(x - 4)(x - 1) = 0$$

$$\boxed{x = 1, 4}$$

$$\hookrightarrow 4^2 - 4(4) + 6 = 3 - |4 - 1|$$

$$16 - 16 + 6 = 3 - 3$$

$$6 = 0 \times$$



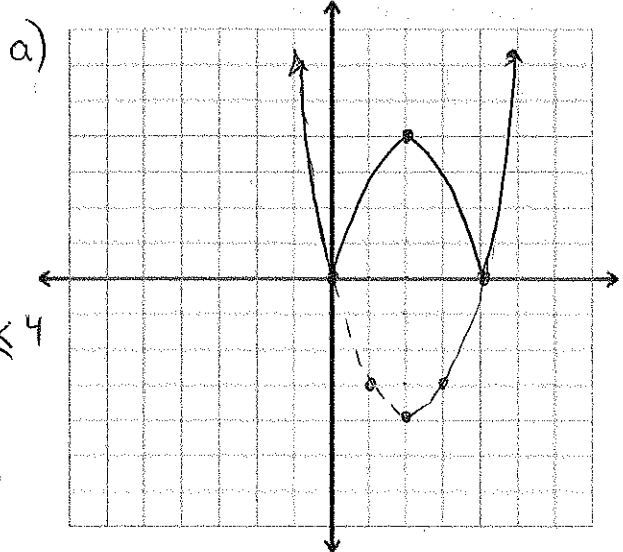
$x = 1, 2$

2. Consider the absolute value function  $y = |(-2 + x)^2 - 4|$   $|x-2|^2 - 4|$
- Sketch the function
  - State the domain and range of the graph
  - Express your graph with piecewise function notation

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b)  $x \in \mathbb{R}$   
 $y \geq 0$

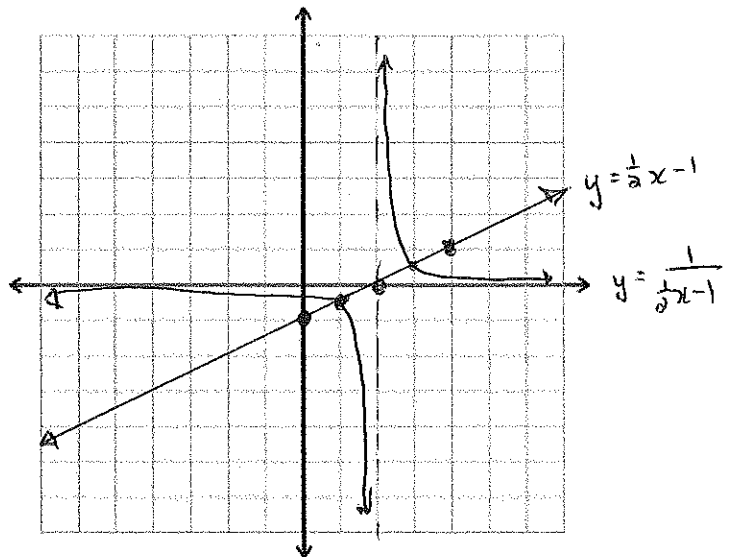
c)  $y = \begin{cases} -(x-2)^2 + 4 & 0 \leq x \leq 4 \\ (x-2)^2 - 4 & x > 4 \\ & x < 0 \end{cases}$



3. Consider the function  $2y + 2 = x$   $2y = x - 2$   
 $y = \frac{1}{2}x - 1$
- Sketch the function
  - Sketch the reciprocal function
  - State the vertical asymptotes
  - State the horizontal asymptotes
  - State the domain and range of the reciprocal function

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c)  $x \neq 2, x \in \mathbb{R}$   
d)  $y \neq 0, y \in \mathbb{R}$   
e)  $x \neq 2, x \in \mathbb{R}$   
 $y \neq 0, y \in \mathbb{R}$



4. Consider the function  $y = (x + 2)^2 - 6$

- a) Sketch the function
- b) Sketch the reciprocal function
- c) State the vertical asymptotes
- d) State the horizontal asymptotes
- e) State the domain and range of the reciprocal function

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$$0 = (x+2)^2 - 6$$

$$6 = (x+2)^2$$

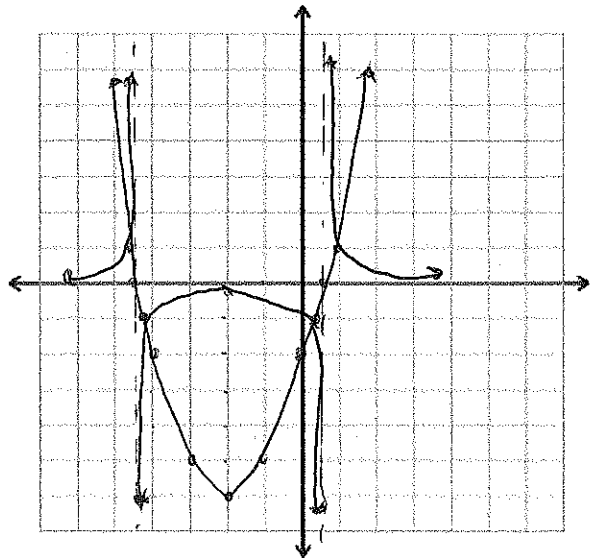
$$x = \pm\sqrt{6} - 2 \approx 0.45, -4.95$$

c)  $x = \sqrt{6} - 2, -\sqrt{6} - 2$

d)  $y = 0$

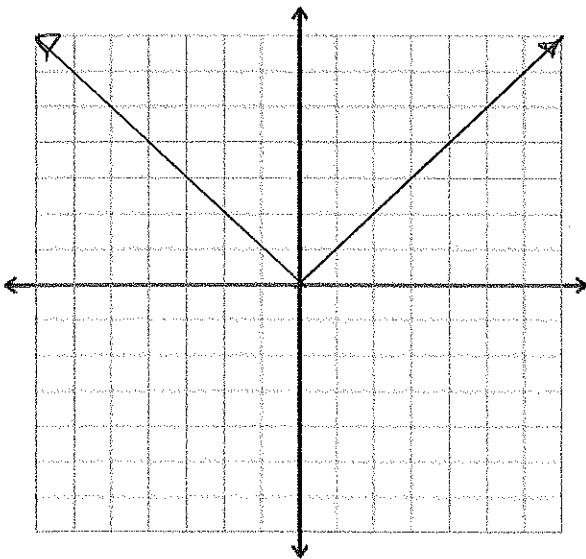
e)  $x \neq \pm\sqrt{6} - 2, x \in \mathbb{R}$

$$y \neq 0, y \in \mathbb{R}$$

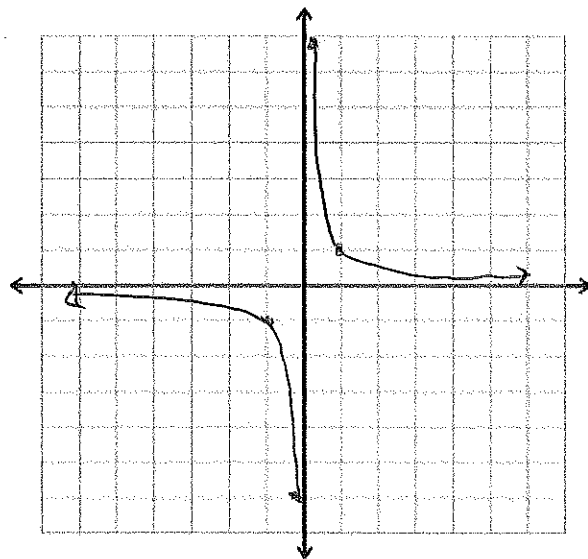


5. Sketch the following functions

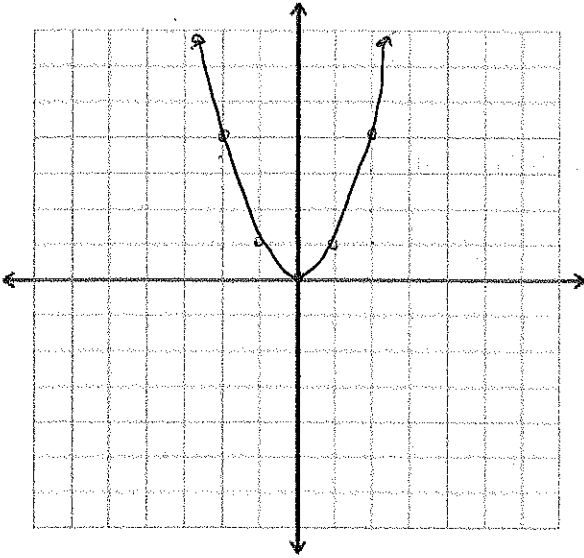
a) The absolute value of  $y = x$



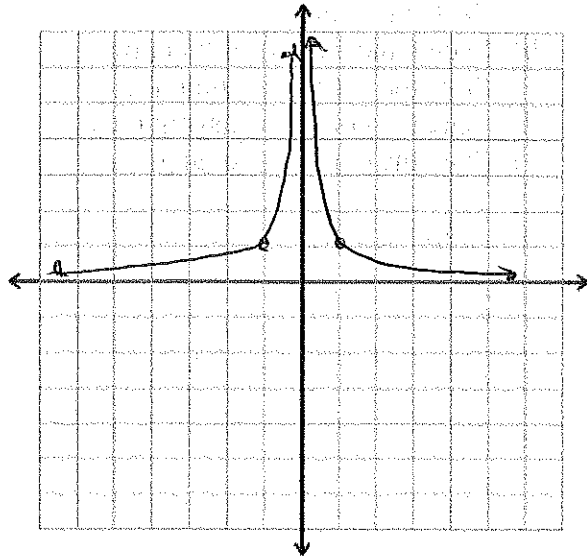
b) The reciprocal of  $y = x$



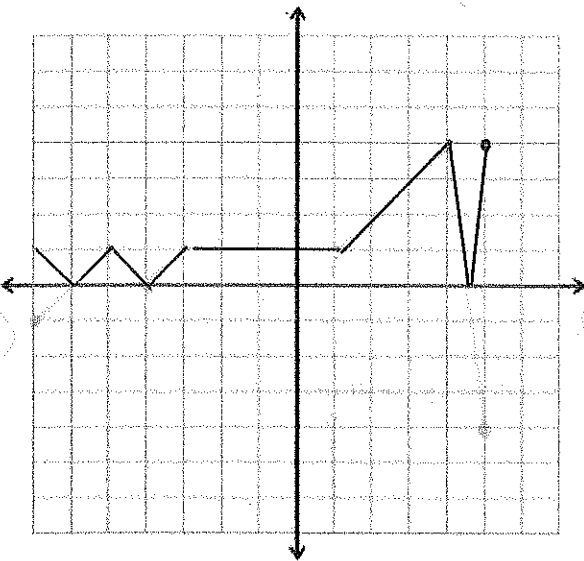
c) The absolute value of  $y = x^2$



d) The reciprocal of  $y = x^2$



e) The absolute value of  $f(x)$



f) The reciprocal of  $f(x)$

