

Name: Answer Key Per: _____ Date: _____
 Serafino • Precalculus S2

12R Piecewise & Rational Functions Review

1. Graph the function, stating all information requested.

$$f(x) = \begin{cases} x^2 - 4, & x \neq 3 \\ -5, & x = 3 \end{cases}$$

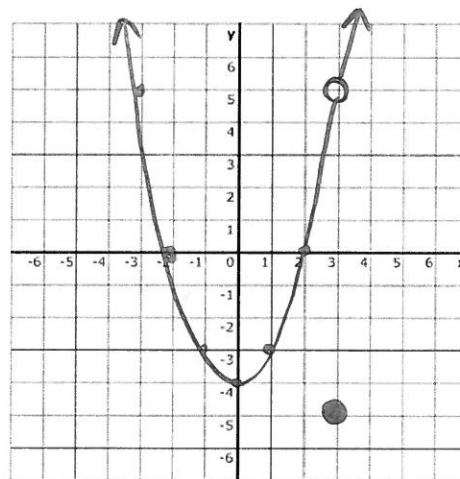
a) Is this function continuous or discontinuous?

b) What's the domain of this function?

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

c) What's the end behavior of this function?

$$\begin{aligned} \text{As } x \rightarrow -\infty, f(x) &\rightarrow \infty \\ x \rightarrow \infty, f(x) &\rightarrow \infty \end{aligned}$$



2. Write the equation of the function.

$$f(x) = \begin{cases} x+3, & x \leq 1 \\ -6(x-1)+4, & 1 < x < 2 \\ (x-2)-2, & x \geq 2 \end{cases}$$

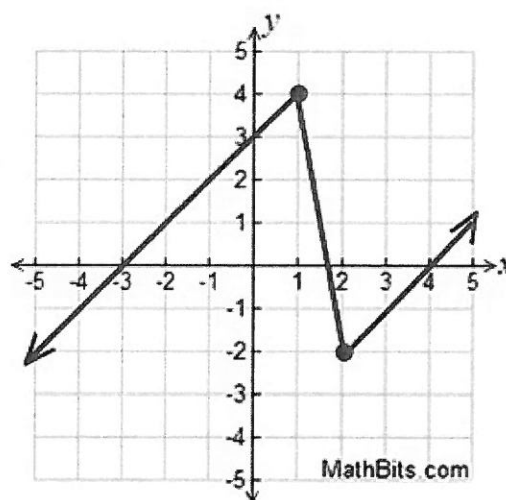
a) Is this function continuous or discontinuous?

b) What's the domain of this function?

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

c) What's the end behavior of this function?

$$\begin{aligned} \text{As } x \rightarrow -\infty, f(x) &\rightarrow -\infty \\ x \rightarrow \infty, f(x) &\rightarrow \infty \end{aligned}$$



3. Graph the function, stating all information requested.

$$f(x) = \frac{6}{(x-2)^2}$$

a) What's the domain of this function?

$$x \neq 2$$

b) What's the end behavior of this function?

$$\text{As } x \rightarrow -\infty \text{ or } \infty, f(x) \rightarrow 0$$

c) VA:

$$x = 2$$

HA:

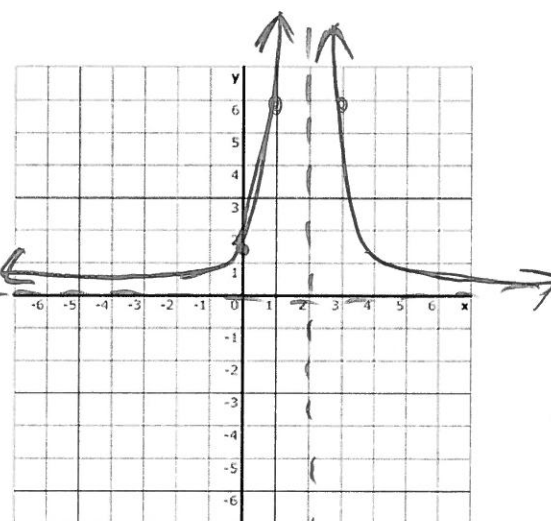
$$y = 0$$

x-int:

none

y-int:

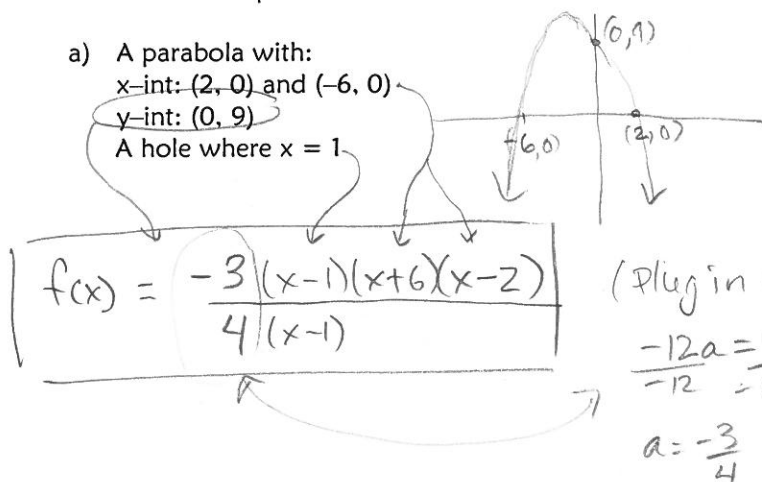
$$(0, 3/2)$$



4. Write the equations of the rational functions with the following properties:

- a) A parabola with:
 x-int: (2, 0) and (-6, 0)
 y-int: (0, 9)
 A hole where x = 1

- b) Infinite discontinuity (VA) at x = 2
 Removable discontinuity at x = -1
 x-int: (0, 0) and (5, 0)
 HA: y = 3



$$f(x) = \frac{-3(x-1)(x+6)(x-2)}{4(x-1)}$$

(Plug in 0, get -12,
 $\frac{-12a}{-12} = \frac{9}{-12}$
 $a = -\frac{3}{4}$)

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

5. $f(x) = \frac{x^2-25}{x^2-4x-5}$	Factored & Simplified function: $\frac{(x-5)(x+5)}{(x-5)(x+1)}$	$\frac{x+5}{x+1}$ $f(5) = \frac{10}{6} = \frac{5}{3}$
Domain: $x \neq 5, -1$	Holes: $(5, 5/3)$	
VA(s): $x = -1$	HA: $y = 1$	
As $x \rightarrow -\infty$, $f(x) \rightarrow 1$	As $x \rightarrow \infty$, $f(x) \rightarrow 1$	
x-int(s): $(-5, 0)$	y-int: $(0, 5)$	

6. Match the function with the graph using what you know about VAs and end behavior.

<u>B</u>	$y = \frac{x^2 - 7}{x^2 + 2}$	Asym, $y = 1$	<u>A</u>		<u>B</u>		<u>C</u>	
<u>D</u>	$y = \frac{x^3}{x^2 - 4}$	$y = x$						
<u>E</u>	$y = \frac{-x^3}{x^2 + 9}$	$y = -x$		<u>D</u>	$y = \frac{x^2 + 4x}{2x - 1}$	$y = \frac{1}{2}x$		
<u>C</u>	$y = \frac{x^2 + 4x}{2x - 1}$	$y = \frac{1}{2}x$						
<u>F</u>	$y = \frac{3}{x^3 - 27}$	$y = 0$						
<u>A</u>	$y = \frac{-8}{x^2 - 4}$	$y = 0$						