Ch. 8 Review Notes

Wednesday, January 17, 2018 10:36 AM

Ch. 8 Review Notes

Pre-Calculus 11 Name _____

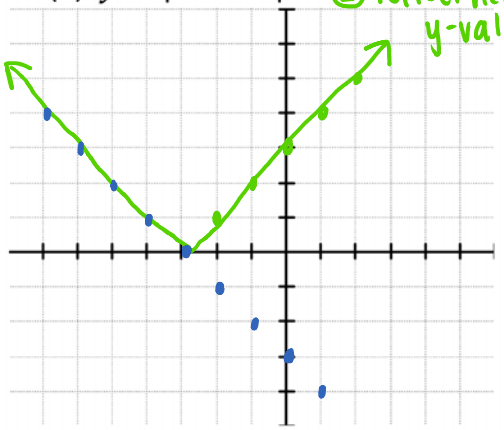
Chapter 8 Absolute Value and Reciprocal Functions

The absolute value of 'x' is defined as $y = |x|$ and can be written: $y = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$

Since the function is defined by two different rules for each interval in the domain, this is an example of a piecewise function/notation

Graph the following: ① graph $y = -x - 3$

(a) $y = |-x - 3|$ ② reflect negative y-values

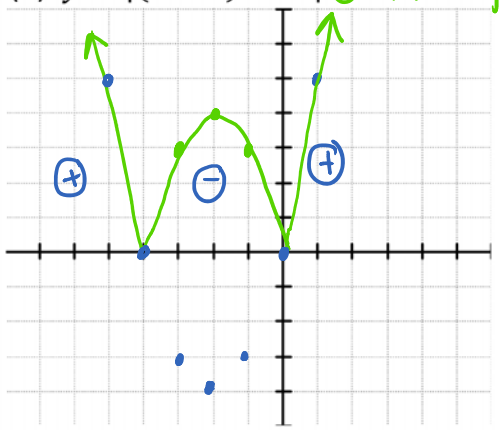


Express the equation as a piecewise function.

$y = \begin{cases} -x - 3, & \text{if } x \leq -3 \\ -(-x-3), & \text{if } x > -3 \end{cases}$

① graph $y = (x+2)^2 - 4$

(b) $y = |(x+2)^2 - 4|$ ② reflect negative y-values



Express the equation as a piecewise function.

$y = \begin{cases} (x+2)^2 - 4, & \text{if } x \leq -4 \text{ and } x \geq 0 \\ -[(x+2)^2 - 4], & \text{if } -4 < x < 0 \end{cases}$

Solve Algebraically and Graphically

$|x + 5| = x^2 + 6x + 5$

$\frac{1}{2}(6) = 3 \rightarrow 3^2 = 9$

$y = (x^2 + 6x + 9 - 9) + 5$

$y = (x+3)^2 - 4$

case ①:

$x + 5 = x^2 + 6x + 5$

$-x - 5 \quad -x - 5$

$0 = x^2 + 5x$

$0 = x(x+5)$

$x = 0$ $x = -5$

check: $x = 0$

$|0 + 5| = 0^2 + 6(0) + 5$

$|5| = 5$

$5 = 5$ ✓

case ②:

$-(x+5) = x^2 + 6x + 5$

$-x - 5 = x^2 + 6x + 5$

$+x + 5 \quad +x + 5$

$0 = x^2 + 7x + 10$

$0 = (x+5)(x+2)$

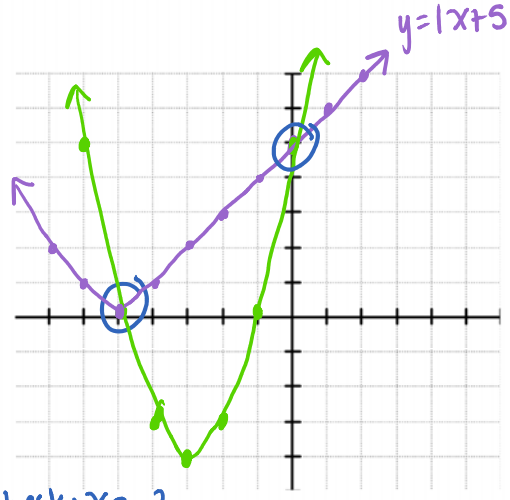
$x = -5$ $x = -2$ ↳ reject

check: $x = -5$

$|-5 + 5| = (-5)^2 + 6(-5) + 5$

$|0| = 25 - 30 + 5$

$0 = 0$ ✓



check: $x = -2$

$|-2 + 5| = (-2)^2 + 6(-2) + 5 \rightarrow |3| = -3x$

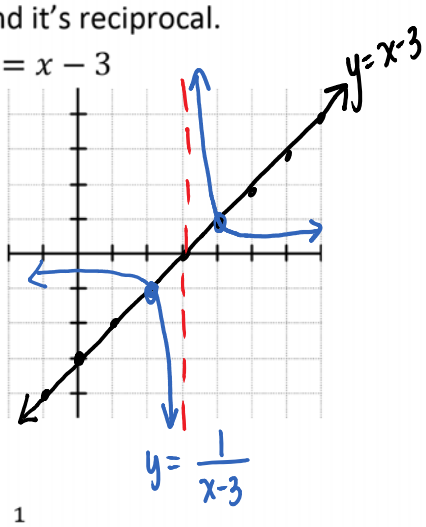
Pre-Calculus 11 Name _____

Properties of Reciprocal Functions

Original Function f(x)	Reciprocal Function $\frac{1}{f(x)}$
Equals 1	equals 1
Equals -1	equals -1
Equals 0	asymptote (vertical)
Positive	positive
Negative	negative
Approaches 0	approaches ∞
Approaches ∞	approaches 0

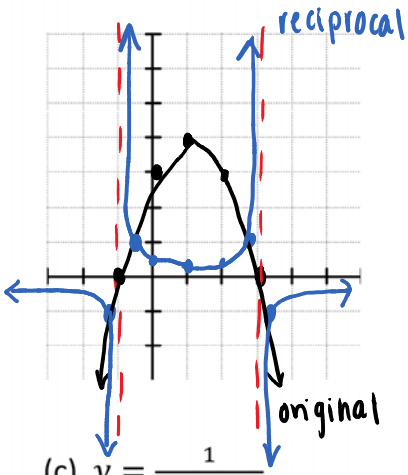
Sketch the following graph and it's reciprocal.

$y = x - 3$

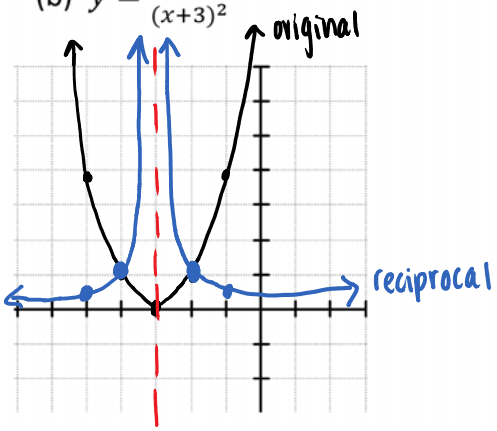


Graph the following:

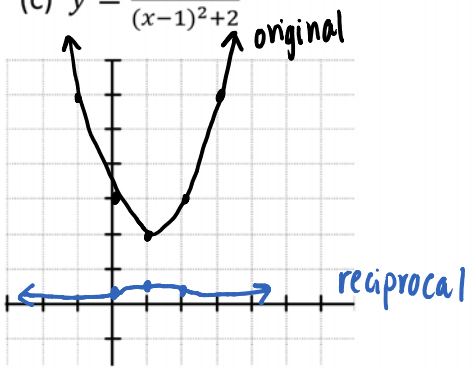
(a) $y = \frac{1}{-(x-1)^2+4}$



(b) $y = \frac{1}{(x+3)^2}$



(c) $y = \frac{1}{(x-1)^2+2}$



(d) $y = \frac{1}{|(x-3)^2-4|}$