Pre-Calculus 11 Absolute Value Functions

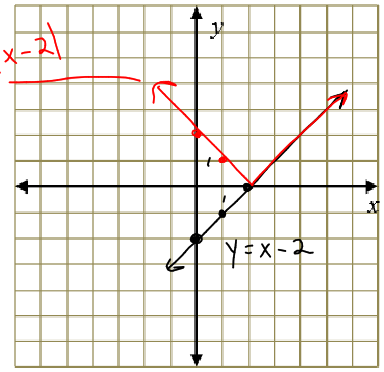
When we graph the absolute value of a linear function, we start by graphing the line (using slope-intercept method) and then reflect all negative values of y.

Sketch the graphs of the following absolute value functions. Identify the intercepts, domain, and range of the function.

1. $y = |x - 2|$

① Sketch $y = x - 2$ (y-int -2; $m = 1$)

② For $y = |x - 2|$, reflect all negative y-values

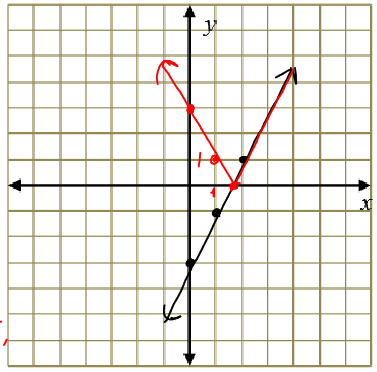


x-int 2
y-int 2
D: $x \in \mathbb{R}$
R: $y \geq 0$

2. $y = |2x - 3|$

Sketch $y = 2x - 3$ (y-int -3; $m = \frac{2}{1}$)

Keep all positive y-values, reflect neg y-values



x-int: set $y = 0$
$0 = 2x - 3$
$3 = 2x$
$\frac{3}{2} = x$

y-int 3

D: $(-\infty, \infty)$
R: $[0, \infty)$

Recall: Graphing a parabola

- You need to complete the square to get it into $y = a(x-h)^2 + k$ (standard form)
- Use transformations to graph the parabola

Rewrite each quadratic equation in standard form.

1. $y = 2x^2 - 4x + 3$

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

$y = 2(x^2 - 2x \quad) + 3$

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

$y = 2(x-1)^2 + 1$

2. $y = x^2 + 4x - 5$

$y = (x^2 + 4x) - 5$

$y = (x^2 + 4x + 4) - 5 - 4$

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

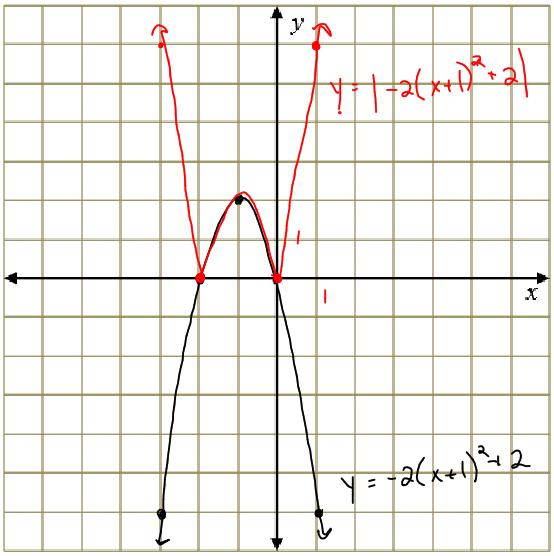
For each function, sketch its graph and determine its intercepts, domain and range.

1. $y = |-2(x+1)^2 + 2|$

1) Sketch $y = -2(x+1)^2 + 2$

mult y-coords by -2

left 1 up 2



2) Keep positive values of y, points at x-ints, reflect negative y-values

x-ints $-2, 0$

y-int 0

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

R: $y \geq 0$

2. $y = |x^2 - 3|$

$y = x^2 - 3$

↑ down 3

x-int

$y = 0$

$0 = x^2 - 3$

$3 = x^2$

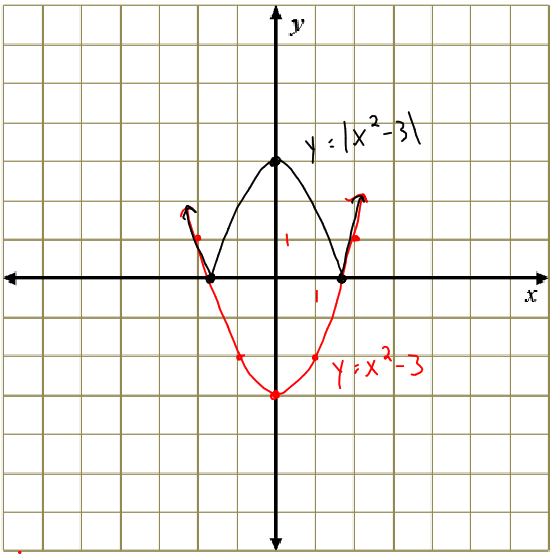
$\pm\sqrt{3} = x$

y-int

3

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

R: $y \geq 0$



Assignment: Pg. 621; #4a, 5, 7a, 10c,d MC#1, 2