

4.5 Quadratic Inequalities

p.1

Ex: Solve $-2x^2 + 30x \leq 52$

1) $y \leq 0$ or $y \geq 0$

$$-2x^2 + 30x - 52 \leq 0$$

$\div (-2):$ $\underbrace{x^2 - 15x + 26}_y \boxed{\geq} 0$

2) x -intercepts of y

$$y = x^2 - 15x + 26$$

Set $y=0$:

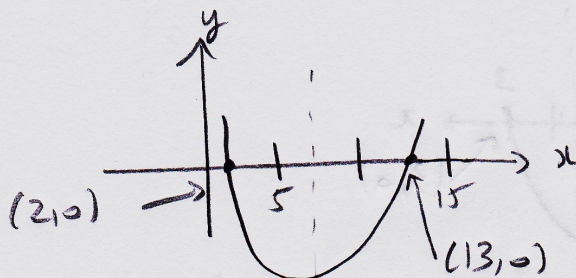
$$0 = x^2 - 15x + 26$$
$$0 = (x-13)(x-2)$$

$$x = 2, 13$$

$(2, 0)$ and $(13, 0)$

3) Graph y

$$y = x^2 - 15x + 26 \text{ opens up } (a > 0)$$



4) Answer

$$y \geq 0$$

$$\boxed{x \leq 2 \text{ or } x \geq 13}$$

$$\boxed{(-\infty, 2] \cup [13, \infty)}$$

Union

Ex: Solve $2x^2 < 5x + 3$

p.2

1) $y < 0$ or $y > 0$

$$\underbrace{2x^2 - 5x - 3}_{y} < 0$$

2) x -intercepts of y

$$y = 2x^2 - 5x - 3$$

Set $y = 0$: $0 = 2x^2 - 5x - 3$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

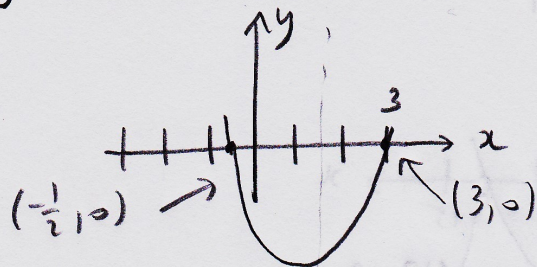
$$= \frac{5 \pm \sqrt{49}}{4}$$

$$= -\frac{1}{2}, 3$$

$$\left(-\frac{1}{2}, 0\right) \text{ and } (3, 0)$$

3) Graph y

$y = 2x^2 - 5x - 3$ opens up ($a > 0$)



4)

$$y < 0$$

$$\boxed{-\frac{1}{2} < x < 3}$$