

EXERCISE 5B

3a. $x^2 + 3x - 5 > 0$

$$(x + \frac{3}{2})^2 - \frac{9}{4} - 5 > 0$$

$$(x + \frac{3}{2})^2 - \frac{29}{4} > 0$$

$$(x + \frac{3}{2})^2 > \frac{29}{4}$$

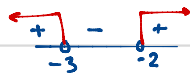
$$x + \frac{3}{2} > \sqrt{\frac{29}{4}} \quad \text{or} \quad x + \frac{3}{2} < -\sqrt{\frac{29}{4}}$$

$$x > -\frac{3}{2} + \frac{1}{2}\sqrt{29} \quad \text{or} \quad x < -\frac{3}{2} - \frac{1}{2}\sqrt{29}$$

4a. $x^2 + 5x + 6 > 0$

$$(x+2)(x+3) > 0$$

ZV: $x = -2, x = -3$



$$x < -3 \quad \text{or} \quad x > -2$$

$$(x + \frac{5}{2})^2 - \frac{25}{4} + 6 > 0$$

$$(x + \frac{5}{2})^2 > \frac{25}{4} - 6$$

$$(x + \frac{5}{2})^2 > \frac{1}{4}$$

$$x + \frac{5}{2} > \frac{1}{2}$$

$$x + \frac{5}{2} < -\frac{1}{2}$$

$$x > -2$$

$$x < -3$$

b. $x^2 + 6x + 9 < 0$

$$(x+3)^2 < 0$$

No solution, sq. number never \ominus

c. $x^2 - 2x - 15 \leq 0$

$$(x-2)^2 - 4 - 15 \leq 0$$

$$(x-2)^2 \leq 19$$

$$-\sqrt{19} \leq x-2 \leq \sqrt{19}$$

$$2 - \sqrt{19} \leq x \leq 2 + \sqrt{19}$$

c. $x^2 - 5x + 2 < 0$

$$(x - \frac{5}{2})^2 - \frac{25}{4} + 2 < 0$$

$$(x - \frac{5}{2})^2 < \frac{25}{4} - \frac{8}{4}$$

$$(x - \frac{5}{2})^2 < \frac{17}{4}$$

$$-\sqrt{\frac{17}{4}} < x - \frac{5}{2} < \sqrt{\frac{17}{4}}$$

$$\frac{5}{2} - \frac{1}{2}\sqrt{17} < x < \frac{5}{2} + \frac{1}{2}\sqrt{17}$$

e. $2x^2 - 5x + 3 \geq 0$

$$(2x-3)(x-1) \geq 0$$

ZV: $x = \frac{3}{2}, 1$



$$x \leq 1 \quad \text{or} \quad x \geq \frac{3}{2}$$

d. $x^2 - x + 1 \geq 0$

$$(x - \frac{1}{2})^2 - \frac{1}{4} + 1 \geq 0$$

$$(x - \frac{1}{2})^2 > \frac{1}{4} - \frac{4}{4}$$

$$(x - \frac{1}{2})^2 > -\frac{3}{4}$$

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

i. $x^2 + x + 1 < 0$

$$(x + \frac{1}{2})^2 - \frac{1}{4} + 1 < 0$$

$$(x + \frac{1}{2})^2 < -\frac{3}{4}$$

$$\therefore \text{No solution}$$

e. $x^2 - 9 < 0$

$$x^2 < 9$$

$$-3 < x < 3$$

j. $2x^2 - 5x + 5 > 0$

$$2(x^2 - \frac{5}{2}x) > -5$$

$$(x - \frac{5}{4})^2 - \frac{25}{16} > -\frac{5}{2}$$

$$(x - \frac{5}{4})^2 > \frac{25}{16} - \frac{40}{16}$$

$$(x - \frac{5}{4})^2 > -\frac{15}{16}$$

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

f. $x^2 + 2x + 1 \leq 0$

$$(x+1)^2 \leq 0$$

$$x = -1 \quad \text{only}$$

h. $8 - 3x - x^2 > 0$

$$-(x^2 + 3x) + 8 > 0$$

$$-\left[(x + \frac{3}{2})^2 - \frac{9}{4}\right] + 8 > 0$$

$$-(x + \frac{3}{2})^2 + \frac{9}{4} + 8 > 0$$

$$\frac{41}{4} > (x + \frac{3}{2})^2$$

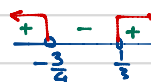
$$-\frac{1}{2}\sqrt{41} < x + \frac{3}{2} < \frac{1}{2}\sqrt{41}$$

$$-\frac{3}{2} - \frac{\sqrt{41}}{2} < x < -\frac{3}{2} + \frac{\sqrt{41}}{2}$$

k. $12x^2 + 5x - 3 > 0$

$$(4x+3)(3x-1) > 0$$

ZV: $x = -\frac{3}{4}$ or $x = \frac{1}{3}$



$$x < -\frac{3}{4} \quad \text{or} \quad x > \frac{1}{3}$$