

Quadratic Inequalities

① a) $x^2 - 11x + 24 < 0$

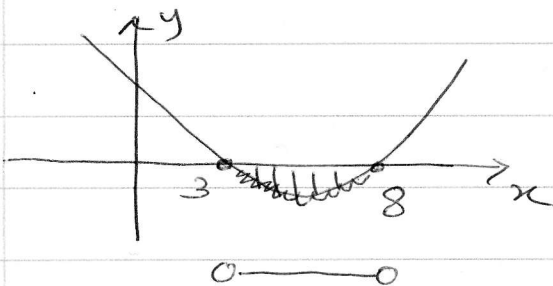
$$y = x^2 - 11x + 24$$

x-intercepts:

$$x^2 - 11x + 24 = 0$$

$$x = 3, \quad x = 8$$

(These x-intercepts are also called the 'Critical Values'.)



$$\underline{\underline{3 < x < 8}}$$

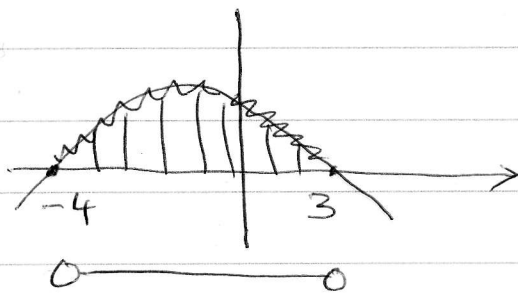
b) $12 - x - x^2 > 0$

$$y = 12 - x - x^2$$

x-intercepts:

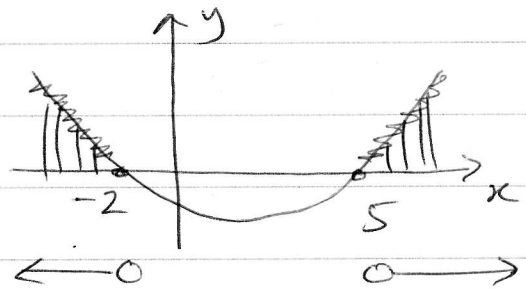
$$12 - x - x^2 = 0$$

$$x = -4, \quad x = 3$$



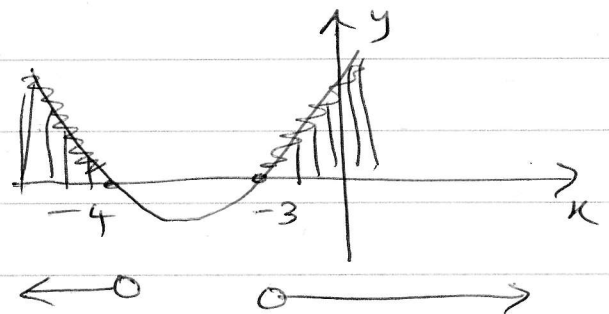
$$\underline{\underline{-4 < x < 3}}$$

c) $x^2 - 3x - 10 > 0$



$$\underline{\underline{x < -2 \text{ or } x > 5}}$$

d) $x^2 + 7x + 12 \geq 0$



$$\underline{\underline{x \leq -4 \text{ or } x \geq -3}}$$

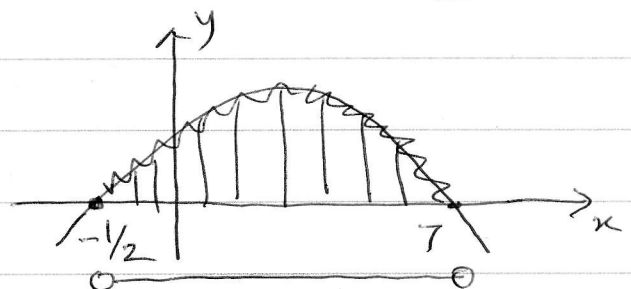
e) $7 + 13x - 2x^2 > 0$

$$y = 7 + 13x - 2x^2$$

x-intercepts:

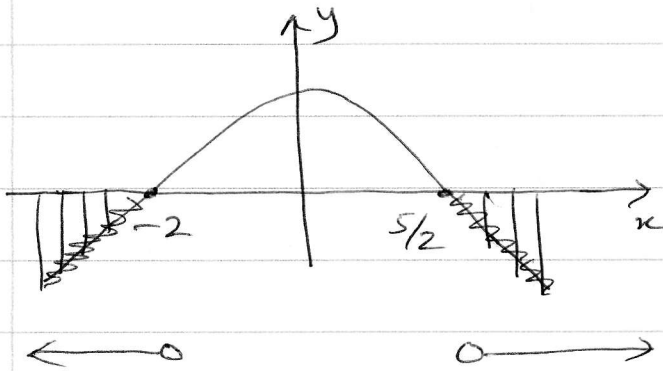
$$7 + 13x - 2x^2 = 0$$

$$x = 7, \quad x = -\frac{1}{2}$$



$$\underline{\underline{-\frac{1}{2} < x < 7}}$$

(f) $10 + x - 2x^2 < 0$



$x < -2$ or $x > \frac{5}{2}$

(g) $4x^2 - 8x + 3 \leq 0$

Ans: $\frac{1}{2} \leq x \leq \frac{3}{2}$

(h) $-2 + 7x - 3x^2 < 0$

Ans: $x < \frac{1}{3}$ or $x > 2$

(i) $x^2 - 9 < 0$

Ans: $-3 < x < 3$

(j) $6x^2 + 11x - 10 > 0$

Ans: $x < -\frac{5}{2}$ or $x > \frac{2}{3}$

(k) $x^2 - 5x > 0$

$x < 0$ or $x > 5$

(l) $2x^2 + 3x \leq 0$

Ans: $-\frac{3}{2} \leq x \leq 0$

~~(m)~~

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(a) $x^2 < 10 - 3x$

Rearrange ...

$x^2 + 3x - 10 < 0$

Ans: $-5 < x < 2$

(b) $11 < x^2 + 10$

Rearrange,

$0 < x^2 - 1$

$x^2 - 1 > 0$

Ans: $x < -1$ or $x > 1$

(c) $x(3 - 2x) > 1$

$3x - 2x^2 > 1$

$2x^2 - 3x + 1 < 0$

Ans: $\frac{1}{2} < x < 1$

(d) $x(x + 11) < 3(1 - x^2)$

$x^2 + 11x < 3 - 3x^2$

$4x^2 + 11x - 3 < 0$

Ans: $-3 < x < \frac{1}{4}$