

1.

In this question you must show all stages of your working.

Solutions relying on calculator technology are not acceptable.

(a) Find the values of x that satisfy

(i) $2x - 10 < 3(5 - x)$

(2)

(ii) $x^2 - 11x + 24 \leq 0$

(2)

(b) Hence find the values of x that satisfy both

$$2x - 10 < 3(5 - x) \text{ and } x^2 - 11x + 24 \leq 0$$

(1)

(a) (i) $2x - 10 < 15 - 3x$

$$+ 3x + 2x < 15 + 10$$

$$5x < 25$$

(1 mark)

$$x < 5$$

(1 mark)

5 > 0, so
dividing both
sides by 5
does not reverse
inequality

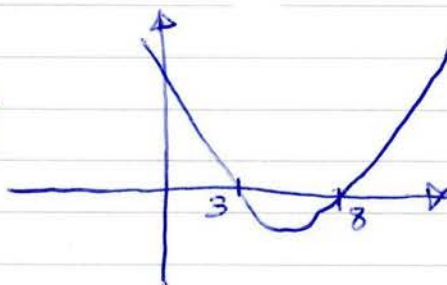
(a) (ii) $x^2 - 11x + 24 \leq 0$

$$(x - 3)(x - 8) \leq 0$$

$$\left\{ \begin{array}{l} ab = 24 \\ a + b = -11 \\ a = -3, b = -8 \end{array} \right.$$

Sketch:

coeff. of x^2 is positive
so curve is 'smiley face'



from sketch, $x^2 - 11x + 24 \leq 0$ for $3 \leq x \leq 8$ (2 marks)

(b)

$$\begin{array}{c} \leftarrow x < 5 \\ 3 \leq x \leq 8 \end{array}$$

Number Line



Two conditions overlap for $3 \leq x < 5$ (1 mark)