

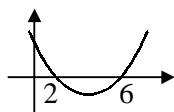
ALGEBRA

Answers

1 a $4 > \frac{3}{2}y$

$$y < \frac{8}{3}$$

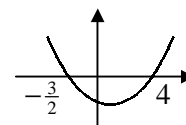
b $(x-2)(x-6) \geq 0$



$$\therefore x \leq 2 \text{ or } x \geq 6$$

2 $2n^2 - 5n - 12 < 0$

$$(2n+3)(n-4) < 0$$



$$-\frac{3}{2} < n < 4$$

$$n \text{ integer } \therefore n = -1, 0, 1, 2, 3$$

3 a $(x+8) \geq 1.5 \times x$

$$8 \geq 0.5x$$

$$x \leq 16$$

b $x(x+8) \geq 180$

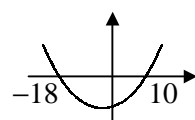
$$x^2 + 8x - 180 \geq 0$$

$$(x+18)(x-10) \geq 0$$

$$x \leq -18 \text{ or } x \geq 10$$

$$\text{but } x > 0 \text{ (width } > 0)$$

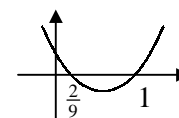
$$\text{and } x \leq 16 \therefore 10 \leq x \leq 16$$



4 $9x^2 - 6x + 1 < 5x - 1$

$$9x^2 - 11x + 2 < 0$$

$$(9x-2)(x-1) < 0$$



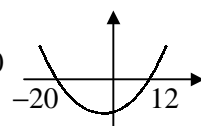
$$\frac{2}{9} < x < 1$$

5 $x = y + 8$

sub. $y(y+8) \leq 240$

$$y^2 + 8y - 240 \leq 0$$

$$(y+20)(y-12) \leq 0$$



$$-20 \leq y \leq 12$$

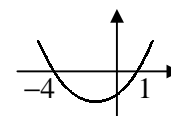
$$x + y = y + 8 + y = 2y + 8$$

$$\therefore \text{max value of } (x+y) = 2(12) + 8 = 32$$

6 $3t^2 - 11t - 4 \geq 2t^2 - 14t$

$$t^2 + 3t - 4 \geq 0$$

$$(t+4)(t-1) \geq 0$$



$$t \leq -4 \text{ or } t \geq 1$$

7 a $2x^2 + 2x - kx + 8 = 0$

real and distinct roots

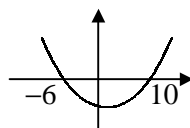
$$\therefore b^2 - 4ac > 0$$

$$(2-k)^2 - 64 > 0$$

$$4 - 4k + k^2 - 64 > 0$$

$$k^2 - 4k - 60 > 0$$

b $(k+6)(k-10) > 0$



$$k < -6 \text{ or } k > 10$$

8 let height be $h \therefore h^2 = (3r-4)^2 - r^2$

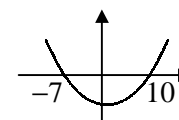
but $h \leq 24$

$$\therefore h^2 \leq 24^2$$

$$(3r-4)^2 - r^2 \leq 576$$

$$r^2 - 3r - 70 \leq 0$$

$$(r+7)(r-10) \leq 0$$



$$-7 \leq r \leq 10$$

$$\therefore \text{maximum value of } r = 10$$