

16th October



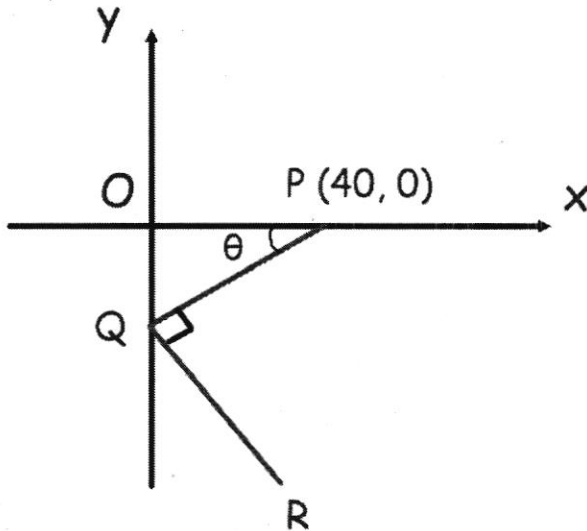
Corbettmaths

For what values of x is
 $y = x^2 + 3x - 54$ an increasing
 function?

$$\frac{dy}{dx} = 2x + 3$$

$$2x + 3 > 0$$

$$\Rightarrow \underline{x > -\frac{3}{2}}$$

Angle $PQR = 90^\circ$

$$\tan \theta = \frac{3}{8}$$

Work out the equation of the line QR

$$OQ = OP \tan \theta = 40 \times \frac{3}{8} = 15$$

$$\Rightarrow Q(0, -15)$$

$$m_{QR} = -\frac{40}{15} = -\frac{8}{3}$$

$$\underline{\text{Eqn QR: } y = -\frac{8}{3}x - 15}$$

Solve the simultaneous equations

$$2x + 3y + 4z = 18 \quad (1)$$

$$x + 2y + 6z = 21 \quad (2)$$

$$4 + y + 2z = 1 \quad (3)$$

$$\rightarrow y + 2z = -3 \quad (3)$$

$$(1) - (3) \times 2 \quad 2x + y = 24$$

$$(2) - (3) \times 3 \quad x - y = 30$$

$$3x = 54 \Rightarrow x = 18$$

$$y = -12$$

$$\Rightarrow \underline{z = \frac{9}{2}}$$

$$-12 + 2z = -3$$