

Problem solving with lines and circles

A LEVEL LINKS

Scheme of work: 2a. Straight-line graphs, parallel/perpendicular, length and area problems

Practice question

1

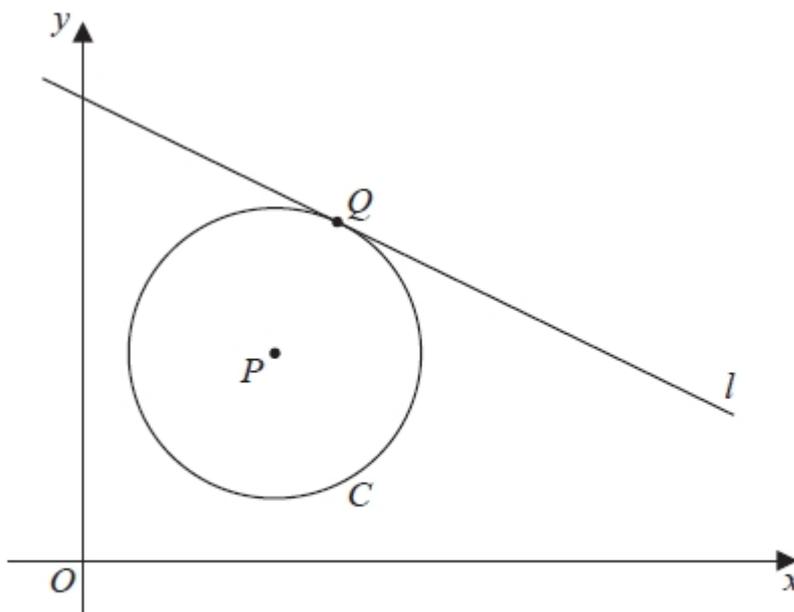


Diagram not
drawn to scale

Figure 2

The circle C has centre $P(7, 8)$ and passes through the point $Q(10, 13)$, as shown in Figure 2.

(a) Find the length PQ , giving your answer as an exact value.

(b) Hence write down an equation for C .

The line l is a tangent to C at the point Q , as shown in Figure 2.

(c) Find an equation for l , giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.

Answers

- 1 (a) $\{PQ\} = \sqrt{(7-10)^2 + (8-13)^2}$ or $\sqrt{(10-7)^2 + (13-8)^2}$
 $\{PQ\} = \sqrt{34}$
- (b) $(x-7)^2 + (y-8)^2 = 34$ (or $(\sqrt{34})^2$)
- (c) $\{\text{Gradient of radius}\} = \frac{13-8}{10-7}$ or $\frac{5}{3}$
Gradient of tangent $= -\frac{1}{m} \left(= -\frac{3}{5} \right)$
 $y-13 = -\frac{3}{5}(x-10)$
 $3x+5y-95=0$