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

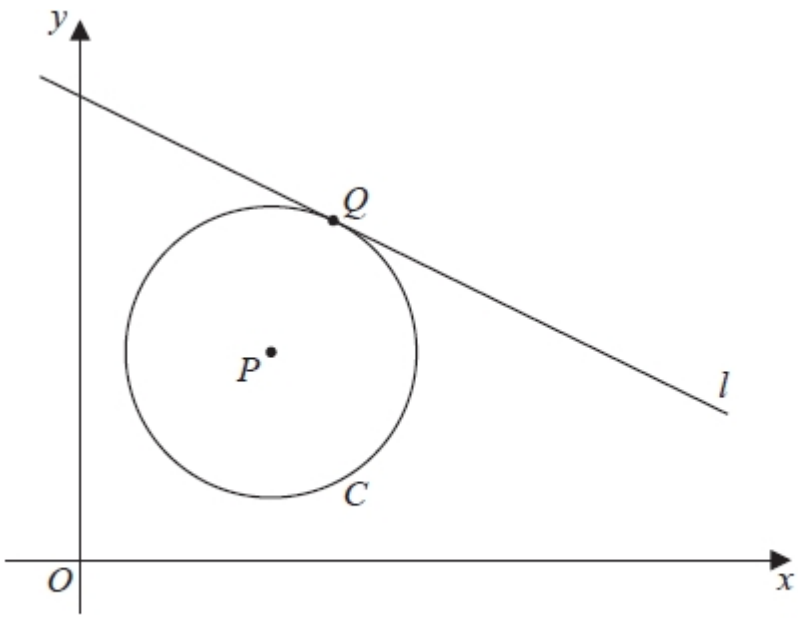

Diagram not drawn to scale

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.

Pearson
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Answers

1 (a) $\{PQ =\} \sqrt{(7-10)^2 + (8-13)^2}$ or $\sqrt{(10-7)^2 + (13-8)^2}$

$\{PQ\} = \sqrt{34}$

(b) $(x-7)^2 + (y-8)^2 = 34 \left(\text{or } \left(\sqrt{34}\right)^2\right)$

(c) $\{\text{Gradient of radius}\} = \dfrac{13-8}{10-7}$ or $\dfrac{5}{3}$

Gradient of tangent $= -\dfrac{1}{m}\left(= -\dfrac{3}{5}\right)$

$y - 13 = -\dfrac{3}{5}(x-10)$

$3x + 5y - 95 = 0$