

M1.

Alternative method 1

$P(1, 3)$ or $y = 3$ or $\text{grad } OP = 3$

B1

$$\text{grad } PQ = -\frac{1}{\text{their } 3} \text{ or } -\frac{1}{3}$$

M1

$$y = \left(\text{their } -\frac{1}{3}\right)x + c$$

and substitutes (1, their 3)

or

$$y - \text{their } 3 = \left(\text{their } -\frac{1}{3}\right)(x - 1)$$

$$\text{oe} \\ \frac{\text{their } 3}{x-1} \text{ or } -\frac{\text{their } 3}{x-1}$$

M1dep

Substitutes $y=0$ in their equation

$$-\frac{\text{their } 3}{x-1} = \text{their } -\frac{1}{3}$$

M1dep

(10, 0)

A1

Alternative method 2

$P(1, 3)$ or $y = 3$ or $\text{grad } OP = 3$

B1

$$\frac{\text{their } 3}{1} = \frac{QN}{\text{their } 3}$$

M1dep

their 3 × their 3 or 9

M1dep

$$\tan \text{PON} = \frac{\text{their } 3}{1}$$

N is on the x-axis
PN is perpendicular to the ~~axis~~

M1

(10, 0)

A1

[5]

M2.

(a) Circle drawn, centre (0, 0), radius 4

B1

(b) $x^2 + y^2 = 16$ or $x^2 + y^2 = 4^2$
 oe

B1

[2]