



1. The point A has coordinates $(-1, 6)$ and the point B has coordinates $(7, 2)$
- a. Find the equation of the perpendicular bisector of AB , giving your answer in the form $y = mx + c$. **(4)**
- b. A point C on the perpendicular bisector has coordinates (p, q) . The distance OC is 2 units, where O is the origin. Write down two equations involving p and q and hence find the coordinates of the possible positions of C . **(5)**

Solutions

1a.

Gradient $AB = \frac{6-2}{-1-7} = \frac{4}{-8} = -\frac{1}{2}$	M1
Gradient of bisector = 2	M1
Midpoint $M: (\frac{-1+7}{2}, \frac{6+2}{2}) = (3, 4)$	M1
Equation of perpendicular bisector is: $y - 4 = 2(x - 3)$ $y - 4 = 2x - 6$ $y = 2x - 2$	M1

1b.

$x = p, y = q$ $q = 2p - 2$	M1
$OC = 2,$ $OC^2 = 4$ $p^2 + q^2 = 4$	M1
$p^2 + (2p - 2)^2 = 4$ $p^2 + 4p^2 - 8p + 4 = 4$ $5p^2 - 8p = 0$ $p(5p - 8) = 0$	M1
$p = 0$ $q = -2$	M1
$5p - 8 = 0$ $p = \frac{8}{5}$ $q = \frac{6}{5}$	M1
$(0, -2)$ and $(\frac{8}{5}, \frac{6}{5})$	

