



1. A circle has equation $(x - 5)^2 + (y + 2)^2 = 25$.
 - a. Find the coordinates of the centre and the length of the diameter. (2)
 - b. Find the equation of the line which passes through C and the point $P(7, 2)$ (3)
 - c. Calculate the length of CP and hence determine whether P lies inside or outside the circle. (2)
 - d. Determine algebraically whether the line with equation $y = 2x$ meets the circle. (4)

Solutions

1a.

Centre $C(5, -2)$	M1
Radius $= \sqrt{25} = 5$ Therefore diameter $= 10$	M1

1b.

Gradient $m = \frac{2 - (-2)}{7 - 5} = 2$	M1
Equation of the line is: $y - 2 = 2(x - 7)$ $y - 2 = 2x - 14$ $y = 2x - 12$	M1

1c.

$CP = \sqrt{(7 - 5)^2 + (2 - (-2))^2}$	M1
$= \sqrt{20} = 2\sqrt{5}$	M1

1d.

$y = 2x$ $(x - 5)^2 + (2x + 2)^2 = 25$ $x^2 - 10x + 25 + 4x^2 + 8x + 4 = 25$ $5x^2 - 2x + 4 = 0$	M1
Discriminant: $(-2)^2 - 4(5)(4) = -76$ as discriminant is less than 0	M1
There are no real roots and therefore line does not intersect.	M1

