

# The Circle Homework - Marking Scheme

Question	Main points of expected responses	
1(a)	<ul style="list-style-type: none"> <li>•<sup>1</sup> Use of Distance Formula</li> <li>•<sup>2</sup> Equate to <math>r^2</math></li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>(x - 1)^2 + (y + 4)^2</math></li> <li>•<sup>2</sup> <math>(x - 1)^2 + (y + 4)^2 = r^2</math></li> </ul>
1(b)	<ul style="list-style-type: none"> <li>•<sup>1</sup> Applying general equation</li> <li>•<sup>2</sup> Finding <math>r^2</math></li> <li>•<sup>3</sup> Equation</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>(5 - (-1))^2 + (13 - 5)^2 = r^2</math></li> <li>•<sup>2</sup> <math>r^2 = 100</math></li> <li>•<sup>3</sup> <math>(x + 1)^2 + (y - 5)^2 = 100</math></li> </ul>
1(c)	<ul style="list-style-type: none"> <li>•<sup>1</sup> Centre is mid-point of PQ</li> <li>•<sup>2</sup> Find diameter and radius</li> <li>•<sup>3</sup> Equation</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>C = (\frac{1}{2}, 7)</math></li> <li>•<sup>2</sup> <math>D = \sqrt{(3 - (-2))^2 + (13 - 1)^2} = 13</math> (<math>r = \frac{13}{2}</math>)</li> <li>•<sup>3</sup> <math>(x - \frac{1}{2})^2 + (y - 7)^2 = \frac{169}{4}</math></li> </ul>
2	<p>(a)</p> <ul style="list-style-type: none"> <li>•<sup>12</sup> States Centre and Radius</li> </ul> <p>(b)</p> <ul style="list-style-type: none"> <li>•<sup>345</sup> States Centre, finds Radius</li> <li>•<sup>6</sup> Re-arranges equation</li> <li>•<sup>7</sup> States Centre</li> <li>•<sup>8</sup> Finds Radius</li> <li>•<sup>9</sup> Calculates Radius</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>12</sup> <math>C = (0, 0), r = 9</math></li> <li>•<sup>345</sup> <math>C = (-4, 5)</math></li> <li><math>r = \sqrt{(-4)^2 + 5^2} - (5) = \sqrt{46}</math></li> <li>•<sup>6</sup> <math>x^2 + y^2 - 2x + \frac{3}{2}y + \frac{1}{4} = 0</math></li> <li>•<sup>7</sup> <math>C = (1, \frac{-3}{4})</math></li> <li>•<sup>8</sup> <math>r = \sqrt{(1)^2 + (\frac{-3}{4})^2} - (\frac{1}{4})</math></li> <li>•<sup>9</sup> <math>r = \frac{\sqrt{21}}{4}</math></li> </ul>
3	<ul style="list-style-type: none"> <li>•<sup>1</sup> Solve simultaneously</li> <li>•<sup>2</sup> Simplifies expression</li> <li>•<sup>3</sup> Solves to get double root</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> Subs <math>y = 10 - 2x</math> into <math>x^2 + y^2 + 20y + 20 = 0</math></li> <li>•<sup>2</sup> <math>x^2 - 16x + 64 = 0</math></li> <li>•<sup>3</sup> <math>x = 8</math> (* May also prove <math>b^2 - 4ac = 0</math>)</li> </ul>
4	<ul style="list-style-type: none"> <li>•<sup>1</sup> Substitutes coordinates into equation of circle</li> <li>•<sup>2</sup> Statement about Point</li> <li>•<sup>3</sup> Finds gradient of contact Radius</li> <li>•<sup>4</sup> Use <math>\perp</math> condition to find gradient of tangent</li> <li>•<sup>5</sup> Uses St Line formula to find equation of tangent</li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>(3)^2 + (4)^2 + 2(3) - 4(4) - 15</math></li> <li>•<sup>2</sup> Answer = 0 <math>\Rightarrow</math> P lies on circles</li> <li>•<sup>3</sup> <math>C = (-1, 2); m_{cp} = \frac{4-2}{3-(-1)} = \frac{1}{2}</math></li> <li>•<sup>4</sup> <math>m_T = -2</math></li> <li>•<sup>5</sup> <math>y - 4 = -2(x - 3);</math> <math>2x + y - 10 = 0</math></li> </ul>
5	<ul style="list-style-type: none"> <li>•<sup>1</sup></li> <li>•<sup>2</sup></li> <li>•<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>•<sup>1</sup></li> <li>•<sup>2</sup></li> <li>•<sup>3</sup></li> </ul>

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6 (b) (i)	<ul style="list-style-type: none"><li>•<sup>1</sup></li><li>•<sup>2</sup></li><li>•<sup>3</sup></li></ul>	<ul style="list-style-type: none"><li>•<sup>1</sup></li><li>•<sup>2</sup></li><li>•<sup>3</sup></li></ul>
6 (b) (ii)	<ul style="list-style-type: none"><li>•<sup>1</sup></li> <li>•<sup>2</sup></li></ul>	<ul style="list-style-type: none"><li>•<sup>1</sup></li> <li>•<sup>2</sup></li></ul>