

<b>(a)</b>	$r = \sqrt{(1+1)^2 + (2-5)^2}$ $= \sqrt{4+9} = \sqrt{13}$ <p>Equation of circle is <math>(x+1)^2 + (y-5)^2 = 13</math></p>	<p><b>Scale 10C (0, 3, 7, 10)</b>  <i>Low Partial Credit</i>            Some correct substitution</p> <p><i>High Partial Credit</i>            Centre and radius of circle correctly identified</p>
<b>(b)</b> <b>(i)</b>	<p>The point of contact on the y-axis is <math>(0, -f)</math></p> $(-f)^2 + 2f(-f) + c = 0$ $f^2 - 2f^2 + c = 0$ $\therefore f^2 = c$	<p><b>Scale 5C (0, 2, 4, 5)</b>  <i>Low Partial Credit</i>            Identifies point of contact with y-axis</p> <p><i>High Partial Credit</i>            Correct substitution into formula</p>
<b>(b)</b> <b>(ii)</b>	$x^2 + y^2 + 2gx + 2fy + c = 0$ <p>At <math>(-3, 6)</math></p> $(-3)^2 + (6)^2 + 2g(-3) + 2f(6) + c = 0$ $9 + 36 - 6g + 12f + c = 0$ $-6g + 12f + c = -45$ $-6g + 12f + f^2 = -45 \quad \text{A}$ $x^2 + y^2 + 2gx + 2fy + c = 0$ <p>At <math>(-6, 3)</math></p> $(-6)^2 + (3)^2 + 2g(-6) + 2f(3) + c = 0$ $36 + 9 - 12g + 6f + c = 0$ $-12g + 6f + c = -45$ $-12g + 6f + f^2 = -45 \quad \text{B}$ $-12g + 24f + 2f^2 = -90 \quad 2A$ $-12g + 6f + f^2 = -45 \quad \text{B}$ <hr style="width: 20%; margin-left: 0;"/> $18f + f^2 = -45$ $f^2 + 18f + 45 = 0$ $(f + 15)(f + 3) = 0$ $f = -15 \text{ and } -3$ $\Rightarrow c = 225 \text{ and } 9$ $\Rightarrow g = 15 \text{ and } 3$ <p>The equations of the circles are:</p> $x^2 + y^2 + 6x - 6y + 9 = 0$ $x^2 + y^2 + 30x - 30y + 225 = 0$	<p><b>Scale 15D (0, 6, 9, 12, 15)</b>  <i>Low Partial Credit</i>            Some correct substitution</p> <p><i>Mid Partial Credit</i>            Two equations identified correctly</p> <p><i>High Partial Credit</i>            Solves simultaneous equations with errors</p>