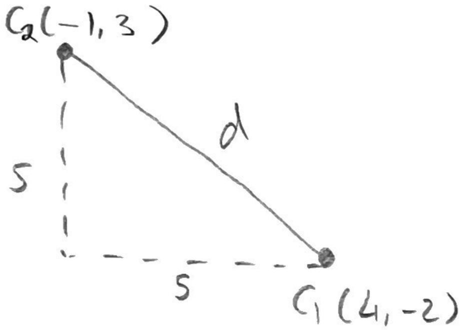
QUESTION NUMBER

DO NOT WRITE IN THIS MARGIN

11.(a)

$C_1\,(4, -2)$

$C_2\,(-1, 3)$



$d = \sqrt{5^2 + 5^2}$

$d = \sqrt{50}$

$d = 5\sqrt{2}$

11.(b)

$r_1 = \sqrt{37}$

$r_2 = \sqrt{1^2 + (-3)^2 + 7}$

$r_2 = \sqrt{17}$

$r_1 + r_2 = 10 \cdot 2$

$d = 7 \cdot 1$

since $d < r_1 + r_2$, the circles intersect at two distinct points.

Question			Generic scheme	Illustrative scheme	Max mark
11.	(a)		$\bullet^1$ state centre of C_1	$\bullet^1$ $(4, -2)$	**3**
			$\bullet^2$ state centre of C_2	$\bullet^2$ $(-1, 3)$	
			$\bullet^3$ calculate distance between centres	$\bullet^3$ $\sqrt{50}$ or $5\sqrt{2}$ or 7.07…	

Notes:

1. Accept $x = 4,\ y = -2$ for $\bullet^1$ and $x = -1,\ y = 3$ $\bullet^2$. Do not accept $g = 1$, $f = -3$ for $\bullet^2$.
2. Do not penalise lack of brackets in $\bullet^1$ and $\bullet^2$.

Commonly Observed Responses:

	(b)		$\bullet^4$ state radius of C_1	$\bullet^4$ $r_1 = \sqrt{37}$ or 6.08…	**3**
			$\bullet^5$ calculate radius of C_2	$\bullet^5$ $r_2 = \sqrt{17}$ or 4.12…	
			$\bullet^6$ demonstrate and communicate result	$\bullet^6$ $10.20\ldots > 7.07\ldots\ (> 1.95\ldots)$ $\therefore$ circles intersect at two distinct points	

Notes:

3. Accept $\sqrt{1^2 + 3^2 + 7} = \sqrt{17}$ or $\sqrt{1^2 + -3^2 + 7} = \sqrt{17}$ for $\bullet^5$. However, do not accept $\sqrt{(-1)^2 + 3^2 + 7} = \sqrt{17}$.
4. At $\bullet^6$ comparison must be made using decimals. Do not accept $\sqrt{37} + \sqrt{17} > \sqrt{50}$ without any further working.
5. Evidence for $\bullet^4$ and $\bullet^5$ may be found in part (a).
6. For candidates who use simultaneous equations, award $\bullet^4$ for substitution of $y = x + 1$ into the equation of one of the circles, $\bullet^5$ for rearranging in standard quadratic form and $\bullet^6$ for obtaining distinct x-coordinates.
7. Do not penalise the omission of "at two distinct points" at $\bullet^6$.

Commonly Observed Responses: