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D $x^2 + y^2 - 5x - y + 4 = 0$ (1) at (1, 0)
let (x_2, y_2) be (1, 0)
$x^2 + y^2 + 2gx + 2fy + c = \cdots$ (11)
Compare eqn (1) & (11)

$2g = -5$

$g = -\frac{5}{2}$; $x_1 = \frac{5}{2}$

$2f = -1$

$f = -\frac{1}{2}$; $y_1 = \frac{1}{2}$

$y = mx + c$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{0 - \frac{1}{2}}{1 - \frac{5}{2}} = \frac{-\frac{1}{2}}{-\frac{3}{2}} = \frac{1}{3}$

recall $m_1 m_2 = -1$

$\frac{1}{3} m_2 = -1$; $m_2 = -3$

$\therefore y = -3x + c$

Substituting the value at point (1, 0)

$0 = -3 + c$

$c = 3$

$\therefore y = -3x + 3$

(2) $x^2 + y^2 - 12x + 12y + 47 = 0$ ... (I)

$x^2 + y^2 + 2gx + 2fy + c = 0$ ... (II)

Comparing eqn (I) & (II)

$2g = -12$

$g = -6$

$2f = -12$

$f = -6$

let $x_1 = 1$ and $y_1 = 0$, $c = 47$

using $xx_1 + yy_1 + g(x + x_1) + f(y + y_1) + c = 0$

$x + 0 + -6(x + 1) - 6(y) + 47 = 0$

$x - 6x - 6 - 6y + 47 = 0$

$-5x - 6y + 41 = 0$

(3) $x^2 + y^2 - 8x + 14y + 40 = 0$ ... (I)

$x^2 + y^2 + 2gx + 2fy + c = 0$ ... (II)

Comparing eqn (I) & (II)

$2g = -8$

$g = -4$

$2f = 14$

$f = 7$

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let $x_1 = 1, y_1 = 0 \quad c = 40$

using $xx_1 + yy_1 + g(x + x_1) + f(y + y_1) + c = 0$

$x + 0 + -4(x + 1) + 7(y) + 40 = 0$

$x - 4x - 4 + 7y + 40 = 0$

$-3x + 7y + 36 = 0$