

3.1

a) $C(5; -2) \quad r=5$

b) $C(-2; 0) \quad r=8$

c) $C(5; -2) \quad r=0$. C'est le point C !

d) $C(0; 5) \quad r=\sqrt{5}$

e) $x^2 - 2x + y^2 + 4y = 20$

$$\Leftrightarrow x^2 - 2 \cdot x \cdot 1 + y^2 + 2 \cdot y \cdot 2 = 20$$

$$\Leftrightarrow (x-1)^2 - 1 + (y+2)^2 - 4 = 20$$

$$\Leftrightarrow (x-1)^2 + (y+2)^2 = 25 \Rightarrow C(1; -2) \\ r=5$$

f) $x^2 - 2x + y^2 + 4y + 14 = 0$

$$\Leftrightarrow (x-1)^2 - 1 + (y+2)^2 - 4 + 14 = 0$$

$$\Leftrightarrow (x-1)^2 + (y+2)^2 = -9$$

$\Rightarrow$ ce n'est pas un cercle !

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$$g) x^2 + 4x + y^2 - 2y + 5 = 0$$

$$\Leftrightarrow (x+2)^2 - 4 + (y-1)^2 - 1 + 5 = 0$$

$$\Leftrightarrow (x+2)^2 + (y-1)^2 = 0 \quad \text{C'est le point } (-2; 1)!$$

$$h) x^2 + x + y^2 = 0$$

$$\Leftrightarrow x^2 + 2 \cdot x \cdot \frac{1}{2} + y^2 = 0$$

$$\Leftrightarrow \left(x + \frac{1}{2}\right)^2 - \frac{1}{4} + y^2 = 0$$

$$\Leftrightarrow \left(x + \frac{1}{2}\right)^2 + y^2 = \frac{1}{4} \quad C\left(-\frac{1}{2}; 0\right)$$

$$r = \frac{1}{2}$$

$$i) x^2 + 6x + y^2 - 4y + 14 = 0$$

$$(x+3)^2 - 9 + (y-2)^2 - 4 + 14 = 0$$

$$(x+3)^2 + (y-2)^2 = -1$$

$\Rightarrow$ Ce n'est pas un cercle.

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$$j) \quad x^2 + y^2 + y = 0$$

$$\Leftrightarrow x^2 + \left(y + \frac{1}{2}\right)^2 = \frac{1}{4}$$

$$\Leftrightarrow x^2 + y^2 + 2 \cdot y \cdot \frac{1}{2} = 0$$

$$C\left(0; -\frac{1}{2}\right)$$

$$r = \frac{1}{2}$$

$$\Leftrightarrow x^2 + \left(y + \frac{1}{2}\right)^2 - \frac{1}{4} = 0$$

$$k) \quad x^2 + y^2 - \frac{3}{2}x + y + \frac{17}{80} = 0$$

$$\Leftrightarrow x^2 - 2 \cdot x \cdot \frac{3}{4} + y^2 + 2 \cdot y \cdot \frac{1}{2} + \frac{17}{80} = 0$$

$$\Leftrightarrow \left(x - \frac{3}{4}\right)^2 - \frac{9}{16} + \left(y + \frac{1}{2}\right)^2 - \frac{1}{4} + \frac{17}{80} = 0$$

$$\Leftrightarrow \left(x - \frac{3}{4}\right)^2 + \left(y + \frac{1}{2}\right)^2 = \frac{9}{16} + \frac{1}{4} - \frac{17}{80}$$

$$C\left(\frac{3}{4}; -\frac{1}{2}\right) \quad = \frac{48}{80} = \frac{3}{5}$$

$$r = \sqrt{\frac{3}{5}}$$

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$$c) \quad x^2 + y^2 - \frac{216}{144}x + \frac{192}{144}y = -\frac{145}{144}$$

$$\Leftrightarrow x^2 + y^2 - \frac{3}{2}x + \frac{4}{3}y = -\frac{145}{144}$$

$$\Leftrightarrow x^2 - 2x \cdot \frac{3}{4} + y^2 + 2 \cdot y \cdot \frac{2}{3} = -\frac{145}{144}$$

$$\Leftrightarrow \left(x - \frac{3}{4}\right)^2 + \left(y + \frac{2}{3}\right)^2 - \frac{9}{16} - \frac{4}{9} = -\frac{145}{144}$$

$$\Leftrightarrow \left(x - \frac{3}{4}\right)^2 + \left(y + \frac{2}{3}\right)^2 = \frac{9}{16} + \frac{4}{9} - \frac{145}{144}$$

$$\Leftrightarrow \left(x - \frac{3}{4}\right)^2 + \left(y + \frac{2}{3}\right)^2 = 0$$

Il s'agit du point $\left(\frac{3}{4}; -\frac{2}{3}\right)$!