SN97

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Maths 102

① $x-y-14=0$ / $x^2+y^2-6x+8y=0$

$x=y+14$

$(y+14)^2+y^2-6(y+14)+8y=0$

$y^2+28y+196+y^2-6y-84+8y=0$

$2y^2+30y+112=0$

$y^2+15y+56=0$

$y^2+7y+8y+56=0$

$y(y+7)+8(y+7)=0$

$(y+8)(y+7)=0$

$y=(-8,-7)$

Put $y=(-8,-7)$ into

$x=y+14$	$x=y+14$
$x=-8+14$	$x+7-14=0$
$x=6$	$x-7=0$
	$x=7$

$x=(6,7)$

So the points of intersections are $x_1 y_1=(6,-8)$ and $x_2 y_2=(7,-7)$

② Let $2x+y-10=0$, $x^2+y^2+4x-6y=0$

$y=10-2x$

$x^2+(10-2x)^2+4x-6(10-2x)=0$

$x^2+100-40x+4x^2+4x-60+12x=0$

$5x^2-24x+40=0$ (Quadratic Eqn)

$x^2-\frac{24x}{5}=-8$

$x^2-\frac{24x}{5}+\left(\frac{24}{5}\cdot\frac{1}{2}\right)^2=-8+\left(\frac{12}{5}\right)^2$

$\left(x-\frac{12}{5}\right)^2=-8+\frac{144}{25}$

$\left(\therefore x-\frac{12}{5}\right)^2=\frac{-200+144}{25}$

$$\left(x-\frac{12}{5}\right)^2=\frac{-52}{25}$$

Take square roots of both sides.

$$x-\frac{12}{5}=\frac{\pm\sqrt{-52}}{5}\quad\left(\begin{matrix}\text{Complex}\\ \text{number}\\ \{j^2=-1\end{matrix}\right)$$

$$x=\frac{12}{5}\pm j\frac{7.21}{5}$$

$$2.4\pm 1.44j$$

$$x=2.4+1.44j$$

or

$$x=2.4-1.44j$$

Recall

$$y=10-2x$$

$$y=10-2(2.4+1.44j)$$

$$=10-4.8-2.88j$$

$$y=5.2-2.88j$$

Also, $=10-2(2.4-1.44j)$

$$y=10-4.8+2.88j$$

$$y=5.2+2.88j$$

So, the points of intersections are $x_1y_1=(2.4+1.44j, 5.2-2.88j)$ and $x_2y_2=(2.4-1.44j, 5.2+2.88j)$

(3) NO SOLUTION, SINCE IT IS NOT A CIRCLE.