MAT 102 05/05/2020

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① $x-y-14=0$ & $x^2+y^2-6x+8y=0$

Solu : $\therefore y=-14+x \quad \therefore y=x-14$

$\therefore$ Using $x^2+y^2-6x+8y=0$

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

$x^2+x^2-14x-14x+196-6x+8x-112=0$

$2x^2-26x+84=0$ $\therefore$ divide through by 2

$x^2-13x+42=0 \quad \therefore x^2-7x-6x+42=0$

$\therefore (x^2-7x)(-6x+42)=0$

$\therefore x(x-7)-6(x-7)=0$

$x-6=0$ or $x-7=0 \quad \therefore x=6$ or $x=7$

$\therefore$ Therefore Substitute in $y=x-14$

When $x=6$ When $x=7$ $\therefore$

$\therefore y=6-14 \qquad y=7-14$

$y=-8 \qquad y=-7$

$\therefore$ One Point of intersection is $(6,-8)$

& another Point of intersection is $(7,-7)$.

(2)

$2x+y-10=0$ & $x^2+y^2+4x-6y=0$

$\therefore$ Solu $y=-2x+10$

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

$x^2+4x^2-20x-20x+100+4x+12x-60=0$

$x^2+4x^2-24x+40$

$\therefore x^2 + 4x^2 - 24x + 40 = 0$

$= 5x^2 - 24x + 40 = 0$

∴ Using quadratic formular

$$\therefore \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-24) \pm \sqrt{(-24)^2 - 4(5)(40)}}{2(5)}$$

$$x = \frac{24 \pm \sqrt{576 - 800}}{10} \quad x = \frac{24 \pm \sqrt{-224}}{10}$$

$$\therefore x = \frac{24 + \sqrt{224}}{10} \quad \text{or} \quad x = \frac{24 - \sqrt{224}}{10}$$

$x = 3.89 \approx 4$ $\quad$ $x = 0.90 \approx 1$

∴ Substituting x in equation $y = -2x + 10$ $\therefore y = (10 - 2x)$

when $x = 4$

$y = 10 - 2(4)$

$y = 2$

when $x = 1$

$y = 10 - 2(1)$

$y = 8$

∴ One point of intersection is $(4, 2)$,

& another point of intersection is $(1, 8)$.

$\therefore x - 5y - 2 = 0$ and $x^2 + 25y^2 - 6xy - 16 = 0$

Solve $y = \frac{x-2}{5}$

$x^2 + 25\left[\frac{x-2}{5}\right]^2 - 6x\left[\frac{x-2}{5}\right] - 16 = 0$

$= x^2 + x^2 - 4x + 4 - 6x\left[\frac{x-2}{5}\right] - 16 = 0$

$= 2x^2 - 4x + 4 - \frac{6x^2 + 12x}{5} - 16 = 0$

Multiply Through by 5

$10x^2 - 20x + 20 - 6x^2 + 12x - 80 = 0$

$10x^2 - 6x^2 - 20x + 12x + 20 - 80 = 0$

$4x^2 - 8x - 60 = 0$

divide through by 4 $[4x^2 - 8x - 60) \div 4$

$x^2 - 2x - 15 = 0$

$x^2 - 5x + 3x - 15 = 0$

$(x^2 - 5x)(3x - 15) = 0$

$x(x-5)\ 3(x-5) = 0$

$(x+3)$ or $(x-5) = 0$

$x = -3$ or $x = 5$

$\therefore$ Substitute x in $y = \frac{x-2}{5}$

when $x = -3$ when $x = 5$

$y = \frac{-3-2}{5}$ $y = \frac{5-2}{5}$

$y = \frac{-5}{5}$ $y = 3/5$

$y = -1$ $y = 3/5$

$\therefore$ The points of intersection are $(-3, -1)$ $(5, 3/5)$.