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MATRIC NO: **19/SCI01/015**

DEPARTMENT: COMPUTER SCIENCE

<u>ASSIGNMENT</u>

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ASSIGNMENT

1. $x - y - 14 = 0$ and $x^2 + y^2 - 6x + 8y = 0$

Solution

$x - y - 14 = 0$ ——— (i)

$x^2 + y^2 - 6x + 8y = 0$ ——— (ii)

make y subject of the formular in eqn (i)

$x - y - 14 = 0$

$-y = 14 - x$

$y = -(14 - x)$

$y = x - 14$ ——— (iii)

Substitute $y = x - 14$ in equation (ii)

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

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

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

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

$2x^2 - 26x + 84 = 0$

Divide through by 2

$x^2 - 13x + 42 = 0$

$42x^2$

$-6 \quad -7$

$x^2 - 6x - 7x + 42 = 0$

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

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

$x - 7 = 0$ or $x - 6 = 0$

$x = 7$ or $x = 6$

Substitute $x = 7$ in eqn (iii)

$y = x - 14$

$y = 7 - 14 = -7$

Therefore one of the points of intersections is $(7, -7)$

Substitute $x=6$ in equation (iii)

$y = x - 14$

$y = 6 - 14$

$y = -8$

Therefore another point of intersection is $(6, -8)$

Point of intersection: $(7, -7)$ and $(6, -8)$

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

Solution

$2x + y - 10 = 0$ —— (i)

$x^2 + y^2 + 4x - 6y = 0$ —— (ii)

make y subject of the formular in equation (i)

$2x + y - 10 = 0$

$y = 10 - 2x$ —— iii

Substitute $y = 10 - 2x$ in equation (ii)

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

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

$x^2 + (10 - 2x)(10 - 2x) + 4x - 60 + 12x = 0$

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

$5x^2 - 20x - 20x + 4x + 12x + 100 - 60 = 0$

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

Using the quadratic formula

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

$a = 5$, $b = -24$ and $c = 40$

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

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

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

If the discriminant (being the expression $b^2 - 4ac$) has a value whic is negative, there will be no x-intercept i.e there is no real numbe for the solution

3) $x-5y-2=0$ and $x^2+25y^2-6xy-16=0$

Solution

$x-5y-2=0 \longrightarrow$ (i)

$x^2+25y^2-6xy-16=0 \longrightarrow$ (ii)

make x the subject of the formular in equation (i)

$x-5y-2=0$

$x=5y+2 \longrightarrow$ (iii)

substitute $x=5y+2$ in equation (iii)

$x^2+25y^2-6xy-16=0$

$(5y+2)^2+25y^2-6(5y+2)y-16=0$

$(5y+2)(5y+2)+25y^2-6y(5y+2)-16=0$

$25y^2+10y+10y+4+25y^2-30y^2-12y-16=0$

$25y^2+25y^2+10y+10y-12y+4-16-30y^2=0$

$50y^2-30y^2+8y-12=0$

$20y^2+8y-12=0$

Divide through by 2

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

$-60y^2$

$10 \quad -6$

$10y^2+10y-6y-6=0$

$10y(y+1)-6(y+1)=0$

$(10y-6)(y+1)=0$

$10y-6=0$ or $y+1=0$

$\frac{\cancel{10}y}{\cancel{10}}=\frac{6}{10}$ or $y=-1$

$y=\frac{3}{5}$ or $y=-1$

Substitute $y=3/5$ in eqn (iii)

$x=5y+2$

$x=5(3/5)+2=5$

Therefore one of the points of intersection is $(5, 3/5)$

Substitute $y = -1$ in equation (iii)

$x = 5y + 2$

$x = 5(-1) + 2$

$x = -5 + 2$

$x = -3$

Therefore another point of intersection is $(-3, -1)$.

Point of intersection: $(5, 3/5)$ and $(-3, -1)$