IFEOLUWA PROMISE
19/ENG02/021
COMPUTER ENGINEERING.
MAT 102

S/N 182.

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

Soln

The equ. of the circle is given by:

$x^2 - 6x + y^2 + 8y = 0$

$(x-3)^2 - 9 + (y+4)^2 - 16 = 0$

$(x-3)^2 + (y+4)^2 - 16 - 9 = 0$.

$(x-3)^2 + (y+4)^2 - 25 = 0$.

$(x-3)^2 + (y+4)^2 = 25$ ... (i)

Centre $= (3, -4)$, radius $= \sqrt{25} = 5$

Linear equ: $x - y - 14 = 0$ ... (ii)

$y = x - 14$.

Sub equ ii into i

$(x-3)^2 + (y+4) = 25$ — (i)

$(x-3)(x-3) + (x - 14 + 4)^2 = 25$.

$x(x-3) - 3(x-3) + (x-10)^2 = 25$.

$x^2 - 3x - 3x + 9 + (x-10)^2 = 25$.

$x^2 - 6x + 9 + x^2 - 20x + 100 = 25$.

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

$(2x^2 - 14x)(-12x + 84) = 0$.

$2x(x-7) - 12(x-1) = 0$.

$(2x - 12)(x - 7) = 0$.

$2x - 12 = 0$ or $x = 7$.

$x = 6$ or $x = 7$.

Substitute the values for $x$ into the linear to get the corresponding values for $y$ (i.e $y$) Cordinates.

$x = 6$, $y = x - 14 = 6 - 14 = -8$ A $(6, -8)$

$x = 7$, $y = 7 - 14 = -7$ = B $(7, -7)$

$(6, -8)$, B $(7, -7)$ are the points of intersection

c) Continuation of (c)

$(20y^2 - 20y) + (12y - 12) = 0$

$20y(y-1) + 12(y-1) = 0$.

$(20y + 12)(y - 1) = 0$.

$20y + 12 = 0$ or $y = 1$

$\frac{20y}{20} = \frac{-12}{20}$ or $y = 1$.

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

∴ Using the values above to find the points of intersection, ~~after~~

when $y = -3/5$, from (ii), $x = 5y - 2$

$= 5(\frac{-3}{5}) - 2 = -5$

∴ point A $= (-5, -3/5)$

when $y = 1$, from (ii), $x = 5y - 2 = 5(1)$

$- 2 = 3$.

Point B $= (3, 1)$.

∴ The points will be A $(-5, -3/5)$ and B $(3, 1)$.

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

Soln

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

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

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

$(x+2)^2+(y-3)^2-13=0 \Rightarrow (x+2)^2+(y-3)^2=13$ ... (i)

Centre $=(-2,3)$ and radius $=\sqrt{13}$

linear equation $= 2x+y-10=0$ ... (ii).

$y=10-2x$ ... (iii) Substitute (iii) into (i)

from (i), $(x+2)^2+(y-3)^2=13$

$(x+2)^2+(10-2x-3)^2=13$.

$\Rightarrow x^2+4x+4+(7-2x)^2=13$.

$x^2+4x+4+(7(7-2x)-2x(7-2x))=13$.

Simplifying: $x^2+4x+4+(49-14x-14x+4x^2)=13$.

$x^2+4x+4+49-28x+4x^2=13$.

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

When Solved the value of $x$ gives an imaginative number -

i.e $x=\frac{12}{5}+\frac{2\sqrt{14}}{5}i$.

This makes it quite impossible to find the points of the Circle and the line.

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

Soln

Given $x^2+25y^2-6xy-16=0$ to be the equation.

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

Given $x-5y-2=0$.

$x=5y-2$ (iii) Substituting.

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

$5y^2-20y+4+y(25y-30y+12)-16=0$.

$5y^2-20y+25y^2-30y^2+12y-12=0$.

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

Solving quadratically.

$20y^2-20y+(12y-12)=0$.

P.T.O.