NAME: OFODI CHRISTABEL

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The point of intersection of the following line on the circle

1) $x - y - 14 = 0$ and $x^2 + y^2 - 6x + 8y = 0$
2) $2x + y - 10 = 0$ and $x^2 + y^2 + 4x - 6y = 0$
3) $x - 5y - 2 = 0$ and $x^2 + 25^2 y - 6xy - 16 = 0$

Solution

1) $x - y - 14 = 0$

$x - 14 = y$

$y = x - 14$ - - - (1)

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

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

$x^2 + x^2 - 28x + 196 + 8x - 112 = 0$

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

Divide thru by 2

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

Using formula method

$= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-13) \pm \sqrt{(-13)^2 - 4(1)(42)}}{2(1)}$

$= \frac{13 \pm \sqrt{169 - 168}}{2}$

$= \frac{13 \pm \sqrt{1}}{2} = \frac{13+1}{2}$ or $\frac{13-1}{2}$

$x = 7$ or 6

Substituting $x = 19.2$ in equation (1) we have

$y = x - 14$

$y = 7 - 14$

$y = -7$

(7, -7)

∴ one of the points of intersection is

Substituting $x=6$ in equation (i) we have:

$y = 6 - 14$

$y = -8$

∴ another points of intersection is $(6, -8)$

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

$x = 5y + 2$ - - - (i)

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

Substituting equation (i) into (ii)

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

$25y^2 + 20y + 4 + 25y^2 - 30y^2 - 12y - 16 = 0$

$25y^2 + 25y^2 - 30y^2 + 20y - 12y + 4 - 16 = 0$

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

Divide through by 2

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

Divide through by 2 again

$5y^2 + 2y - 3 = 0$

$y = 0.6$ or -1

Substituting $y = 0.6$ in equation (i), we have:

$x = 5(0.6) + 2$

$x = 5$

∴ the point of intersection in $(5, 0.6)$

Substituting $y = -1$ in equation (i) we have,

$x = 5(-1) + 2$

$x = -3$

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

2. $2x + y - 10 = 0$

$y = -2x + 10 \quad -(i)$

$x^2 + y^2 + 4x - 6y = 0 \quad -(ii)$

Substituting equation (i) into (ii) we have,

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

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

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

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

This is an imaginary line.