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DEPT: COMPUTER ENGINEERING
MATRIC NO: 16/ENG02/020
COURSE: MAT 102.

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

$y=x-14$ ... (i)

subst. $y=x-14$ into eqn of a circle

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

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

$x^2+x^2-28x+196-6x+8(x-14)=0$

$2x^2-28x+196-6x+8x-112=0$

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

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

$(x^2-6x)-(7x+4)=0$

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

$\therefore x=7$ or $x=6$.

when $x=7$

$y=x-14=7-14=-7$

$\therefore$ A Point of Intersection $(7,-7)$

when $x=6$

$y=x-14=6-14=-8$

Another Point of Intersection is $(7,-8)$

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

$y=10-2x$

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

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

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

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

Using the quadratic formula.

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

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

$$x=\frac{24\pm\sqrt{(-24)^2-4(5\times40)}}{10}$$

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

$\therefore\ x=12/5+2\sqrt{14}/5\,i$ or $x=12/5-2\sqrt{14}/5\,i$

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

$x-5y-2=0$

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

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

Sub $y=\frac{x-2}{5}$ into eqn of a circle

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

$$5\left(x^2+25\times\left(\frac{x-2}{5}\right)^2-6x\times\left(\frac{x-2}{5}\right)-80=0\right.$$

$$5\left(x^2+\frac{25(x-2)^2}{5^2}-6x\times\left(\frac{x-2}{5}\right)-80=0\right.$$

$$5\left[\frac{5^2\times x^2}{5^2}+\frac{25(x-2)^2}{5^2}-6x\times\left(\frac{x-2}{5}\right)\right]-80=0$$

$$5\left(\frac{25x^2+25x^2-100x+100}{5^2}-6x\times\left(\frac{x-2}{5}\right)\right)-80=0$$

$$5\left(\frac{25x^2+25x^2-100x+100}{5^2}-\frac{6(x-2)x}{5}\right)-80=0$$

$$5\left(\frac{50x^2+100x+100}{5^2}-\frac{6(x-2)}{5}x\right)-80=0$$

$$5\left(4-4x+2x^2-\frac{6(x-2)}{5}x\right)-80=0$$

$$5\left(4-{}^{8}/_{5}x+{}^{4}/_{5}x^2\right)-80=0$$

$$20-8x+4x^2-80=0$$

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

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

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

Using the quadratic formula.

~~$a=1,\ b=-2,\ c=15$~~

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

~~$x=\frac{2\pm\sqrt{4-4(15)}}{2(1)}$~~

$a=4,\quad b=-8,\quad c=60$

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

$$x=\frac{+8\pm\sqrt{64-4(4\times60)}}{2a(4)}$$

$$x=\frac{8\pm\sqrt{64-32}}{8}$$

$$x=\frac{8\pm32}{8}$$

$x=\frac{8+32}{8}=5$ or $\frac{8-32}{8}=-3$

when $x = 5$

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

$\therefore$ A Point of Intersection is $(5, 3/5)$

when $x = -3$

$y = \frac{-3-2}{5} = \frac{-5}{5} = -1$

$\therefore$ Another Point of Intersection is $(-3, -1)$