

4 - circle 4

$$h = 7 + 1 = 8$$

$$k = 6 - 1 = 5$$

$$(x - 8)^2 + (y - 5)^2 = 1^2$$

equation circle

Q) write the equation of the circle with center $(5, 4)$ that is tangent to

a) the x -axis

b) the y -axis

a) the x -axis, the point $(5, 4)$
 $y = 0$

$$(x-h)^2 + (y-k)^2 = r^2 \quad \text{معادلة الدائرة}$$

$$(x-5)^2 + (y-4)^2 = r^2$$

$$y = 0 \quad \text{معادلة المستقيم}$$

$$(5, 4) \quad \text{النقطة المارة}$$

$$\therefore \text{المسافة بين مستقيم ونقطة} \quad r = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

$$r = \frac{0 \times 5 + 1 \times 4 + 0}{\sqrt{0^2 + 1^2}}$$

$$a = 0, b = 1, c = 0 \quad \text{من معادلة الخط}$$

$$r = \frac{|0 \times 5 + 1 \times 4 + 0|}{\sqrt{0^2 + 1^2}} = \frac{|4|}{1} = 4$$

$$(x-5)^2 + (y-4)^2 = 16$$

:- معادلة الدائرة

$$(x-5)^2 + (-4)^2 = 16$$

نعوض بالمعادلة $y=0$

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

$$x-5 = 0 \Rightarrow x = 5$$

اذن، النقطة التي تمر منها محيط الدائرة هي $(5, 0)$

b) معاد تقاطع كل قطر معادلة المسكن هي $x=0$

$$a=1, b=0, c=0$$

حيث يكون

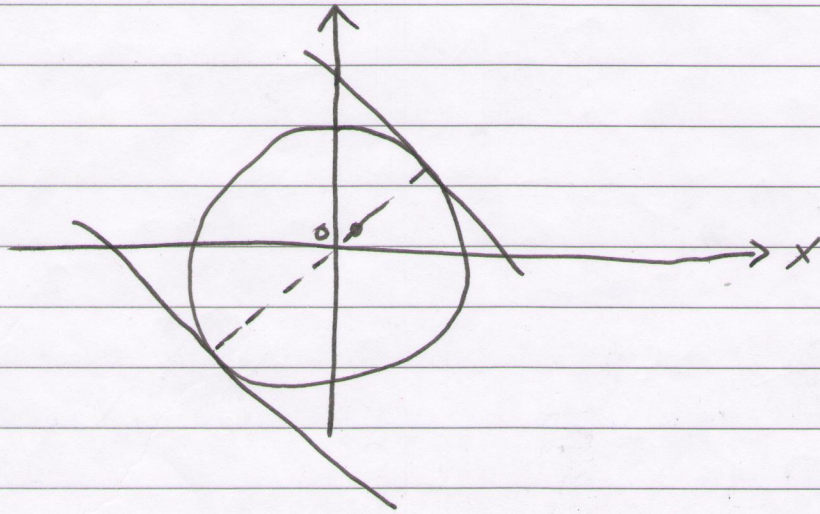
$$r^2 = 25$$

لذا يكون

$$(0, 4)$$

و النقطة هي

Q.) A point on the circle $x^2 + y^2 = 9$ has the distance from the is equal to the slope of line joining it to the origin, what is the point



∴ القطر عمودي على المماسين إذن $m = -\frac{1}{m_1}$

من ضلوع المثلث $m = \frac{-1}{r}$

$$x^2 + y^2 = 9 \quad \text{--- (1)}$$

$$y^2 = 9 - x^2$$

$$2y y' = 0 - 2x$$

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

لكن، المعادلة مركزها النقطة $(0,0)$

$$(x-h)^2 + (y-k)^2 = r^2 \quad \text{اذن}$$

$$(X-0)^2 + (Y-0)^2 = R^2$$

$$X^2 + Y^2 = 9$$

$$R^2 = 9$$

$$R = \sqrt{9} = 3$$

$$y' = m = \frac{-1}{r}$$

$$\frac{-X}{y} = \frac{-1}{3}$$

$$y = 3X \quad \text{--- (2)}$$

نعوض (2) في (1)

$$X^2 + (3X)^2 = 9$$

$$10X^2 = 9 \Rightarrow X^2 = \frac{9}{10} \Rightarrow X = \pm \sqrt{\frac{9}{10}}$$

$$X = \pm \frac{3}{\sqrt{10}} \quad \text{--- (3)}$$

نعوض (3) في (2)

$$y = 3\left(\pm \frac{3}{\sqrt{10}}\right) \Rightarrow y = \pm \frac{9}{\sqrt{10}}$$

the point is $\left(\frac{3}{\sqrt{10}}, \frac{9}{\sqrt{10}}\right), \left(-\frac{3}{\sqrt{10}}, \frac{9}{\sqrt{10}}\right)$

Q₃) for what value of (k) are the two lines parallel

a) $3x + ky = 7$, $6x - 2y = 5$ $m_1 = m_2$

$$6x - 2y = 5$$

$$6 - 2y' = 0$$

$$2y' = 6$$

$$y' = 3$$

$$3x + ky = 7$$

$$3 + ky' = 0$$

$$ky' = -3 \Rightarrow y' = \frac{-3}{k}$$

$$\frac{-3}{k} = 3$$

$$k = \frac{-3}{3} = -1$$

b) $3x + ky = 7$, $6x - k^2y = 5$

$$3x + ky = 7$$

$$3 + ky' = 0 \Rightarrow y' = \frac{-3}{k}$$

$$6x - k^2y = 5$$

$$6 - k^2y' = 0 \Rightarrow y' = \frac{6}{k^2}$$

$$m_1 = m_2$$

$$\frac{6}{k^2} = \frac{-3}{k}$$

$$k = \frac{-6}{3} = -2$$

Q₃) For what value of (k) is the

$$\text{Line } kx + 2y = 3$$

$$m_2 = \frac{-1}{m_1}$$

a) perpendicular to the line

$$x + y = 1$$

$$x + y = 1 \Rightarrow 1 + y' = 0$$

$$y' = -1$$

$$kx + 2y = 3 \Rightarrow k + 2y' = 0$$

$$y' = \frac{-k}{2}$$

$$\frac{-k}{2} = \frac{-1}{-1}$$

$$k = -2$$

b) parallel to the line $x+y=1$

$$x+y=1 \Rightarrow 1+y'=0 \Rightarrow y'=-1$$

$$kx+2y=3 \Rightarrow k+2y'=0 \Rightarrow y'=-\frac{k}{2}$$

$$m_1 = m_2$$

$$-1 = \frac{-k}{2}$$

$$k=2$$

Q) Find the equation of the circle with the center $(6, 7)$ and tangent to the circle $(x+2)^2 + (y-1)^2 = 9$

معادلة الدائرة

$$(x-h)^2 + (y-k)^2 = r^2$$

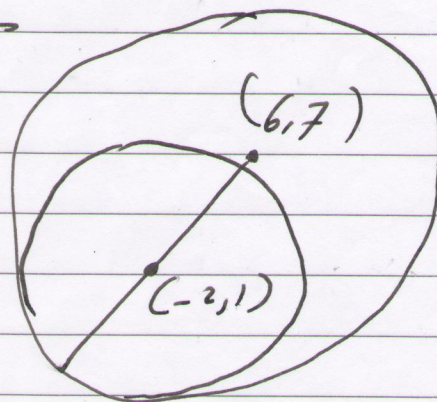
معادلة الدائرة المعطاة

$$-h = +2$$

$$h = -2$$

$$-k = -1$$

$$k = 1$$



المسافة بين نقطتين

$$D = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$D = \sqrt{(6+2)^2 + (7-1)^2} = \sqrt{100} = 10$$

الخط معادلة الدائرة

$$r_1 = 10 - 3 = 7$$

$$r_2 = 10 + 3 = 13$$

مربعون معادلة الدائرة

$$(x-6)^2 + (y-7)^2 = 49$$

$$(x-6)^2 + (y-7)^2 = 169$$

Q) Find the points of intersection of the line $3x + 2y + 13 = 0$ with the circle $x^2 + y^2 = 65$

$$3x + 2y + 13 = 0$$

$$x = \frac{-13 - 2y}{3} \quad \text{--- (1)}$$

$$x^2 + y^2 = 65 \quad \text{--- (2)}$$

مربع (1) في (2)

$$\left(\frac{-13 - 2y}{3}\right)^2 + y^2 = 65$$

$$169 + 52y + \cancel{4y^2} + 4y^2 + 9y^2 = 585$$

$$13y^2 + 52y - 416 = 0$$

$$(13y + 104)(y - 4) = 0$$

$$13y + 104 = 0$$

$$y = -\frac{104}{13} \Rightarrow y = -8 \quad (3)$$

بمعنى (3) في (1)

$$x = \frac{-13 - 2 \times (-8)}{3} \Rightarrow x = \frac{3}{3} = 1$$

$\therefore$ point $(1, -8)$

or

$$y - 4 = 0 \Rightarrow y = 4$$

$$x = \frac{-13 - 2 \times (4)}{3} = -7$$

$\therefore$ point $(-7, 4)$