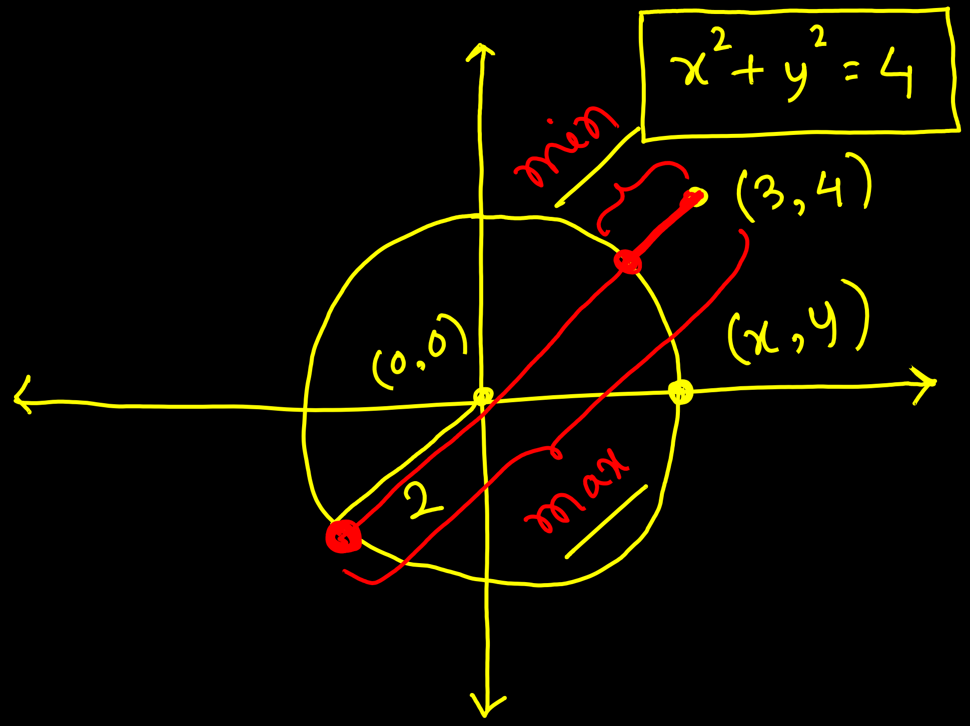


$$d=\sqrt{(x-3)^2+(y-4)^2}$$

$$x^2+y^2=4$$

$$f(x,y)=(x-3)^2+(y-4)^2$$

$$g(x,y)=x^2+y^2-4$$

$\max(\sqrt{m})$ ✓

$\max(m)$ ✗

$\max(2m)$ ✓

$$f(x,y)=x^2-6x+9+y^2-8y+16$$

$$g(x,y)=x^2+y^2-4$$

$$f(x, y) - \lambda \cdot g(x, y) = 0$$

$$\Rightarrow x^2 - 6x + 9 + y^2 - 8y + 16 - \lambda(x^2 + y^2 - 4) = 0$$

$$\Rightarrow x^2 - 6x + 25 + y^2 - 8y - \lambda x^2 - \lambda y^2 + 4\lambda = 0$$

$\underline{F_x}$

$$2x - 6 + 0 + 0 - 0 - 2\lambda x - 0 + 0 = 0$$

$$\Rightarrow 2x - 2\lambda x = 6$$

$$\Rightarrow x = \frac{6}{2 - 2\lambda} = \boxed{\frac{3}{1 - \lambda}}$$

$$x^2 - 6x + 9 + y^2 - 8y + 16 - \lambda x^2 - \lambda y^2 + 4\lambda = 0$$

<u>Fy</u>

$$0 - 0 + 0 + 2y - 8 + 0 - 0 - 2\lambda y + 0 = 0$$

$$\Rightarrow 2y - 2\lambda y = 8$$

$$\Rightarrow y = \frac{8}{2 - 2\lambda} = \boxed{\frac{4}{1-\lambda}}$$

$$x^2 + y^2 = 4$$

$$\Rightarrow \left(\frac{3}{1-\lambda}\right)^2 + \left(\frac{4}{1-\lambda}\right)^2 = 4$$

$$\Rightarrow \frac{9}{(1-\lambda)^2} + \frac{16}{(1-\lambda)^2} = 4$$

$$\Rightarrow \frac{25}{(1-\lambda)^2} = 4$$

$$\Rightarrow (1-\lambda)^2 = \frac{25}{4}$$

$$\Rightarrow 1-\lambda = \pm \frac{5}{2}$$

$(+)$

$$1-\lambda = \frac{5}{2}$$

$$\Rightarrow 1 - \frac{5}{2} = \lambda \Rightarrow \lambda = \frac{2-5}{2} = \frac{-3}{2}$$

$(-)$

$$1-\lambda = -\frac{5}{2}$$

$$\Rightarrow 1 + \frac{5}{2} = \lambda$$

$$\Rightarrow \lambda = \frac{2+5}{2} = \frac{7}{2}$$

when, $\lambda = -\frac{3}{2}$

$$x = \frac{3}{1-\lambda} = \frac{3}{1+\frac{3}{2}} = \frac{3}{\frac{5}{2}} = \frac{6}{5}$$

when, $\lambda = \frac{7}{2}$

$$x = \frac{3}{1-\lambda} = \frac{3}{1-\frac{7}{2}} = \frac{3}{\frac{-5}{2}} = -\frac{6}{5}$$

when, $\lambda = -\frac{3}{2}$

$$y = \frac{4}{1-\lambda} = \frac{4}{1+\frac{3}{2}} = \frac{8}{5}$$

when, $\lambda = \frac{7}{2}$

$$y = -\frac{8}{5}$$

$$(x, y) = \left(\frac{6}{5}, \frac{8}{5}\right)$$

$$(x, y) = \left(-\frac{6}{5}, -\frac{8}{5}\right)$$

$$(x, y) = \left(\frac{6}{5}, \frac{8}{5}\right)$$

$$d = \sqrt{\left(\frac{6}{5} - 3\right)^2 + \left(\frac{8}{5} - 4\right)^2}$$

$$= \sqrt{9}$$

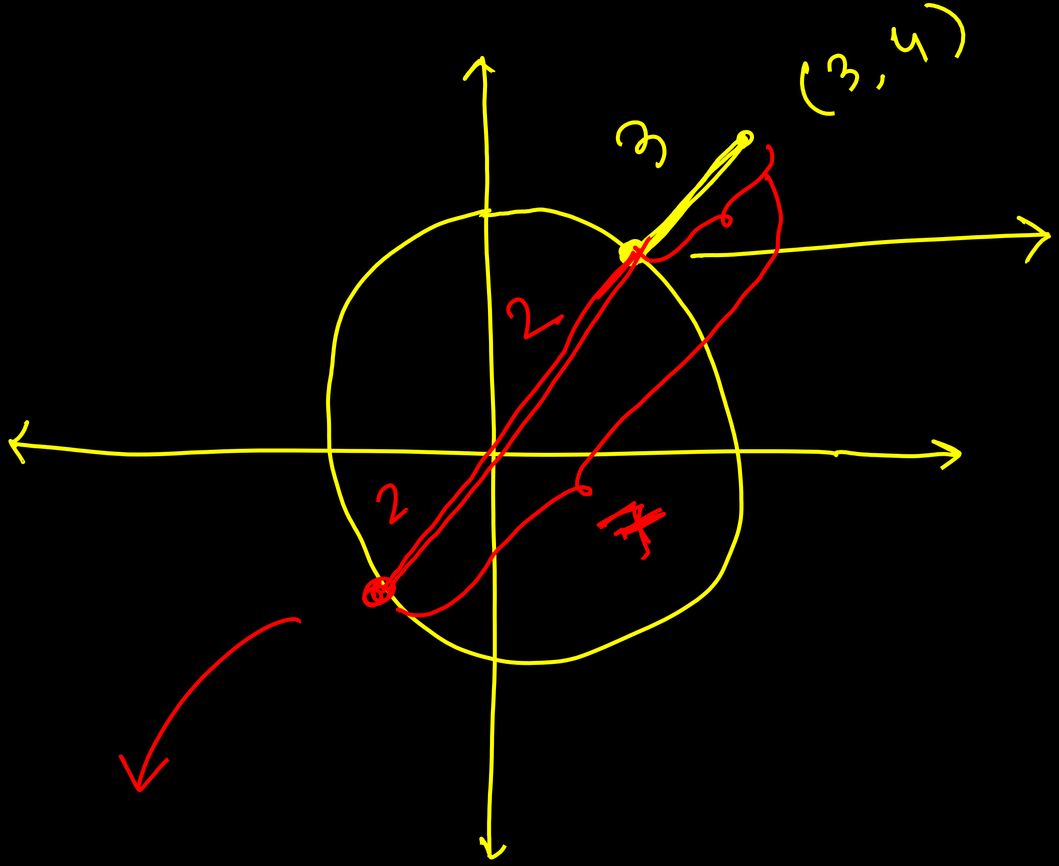
$$= 3 \ (\text{Min})$$

$$(x, y) = \left(-\frac{6}{5}, -\frac{8}{5}\right)$$

$$d = \sqrt{\left(-\frac{6}{5} - 3\right)^2 + \left(-\frac{8}{5} - 4\right)^2}$$

$$= \sqrt{49}$$

$$= 7 \ (\text{Max})$$



$$\left(\frac{6}{5}, \frac{8}{5}\right)$$

$$\left(-\frac{6}{5}, -\frac{8}{5}\right)$$