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TEST

1) $5x^2 + y^2 = 5$
$x^2 + y^2 = 4$

Soln

$4x^2 = 1$
$x^2 = \sqrt{\frac{1}{4}}$
$x = \frac{1}{4}$

Sub x in eqn (2)
$x^2 + y^2 = 4$
$(\frac{1}{2})^2 + y^2 = 4$
$y^2 = 4 - \frac{1}{4}$
$y = \sqrt{\frac{15}{4}}$
$y = 1.9365$

$\frac{dy}{dx} = \tan\theta$, $\tan\theta = -1.2910$.
$\theta_1 = \tan^{-1} -1.2910 = -52.24°$

Angle $= (\theta_2)$
$x^2 + y^2 = 4$
$2x + 2y\frac{dy}{dx} = 0$, $\frac{dy}{dx} = \frac{2x}{2y}$

$2\frac{dy}{dx} = \frac{-x}{y}$, Sub x and y

$\frac{dy}{dx} = \frac{-1}{2} \div \frac{\sqrt{15}}{2} = -\frac{1}{2} \times \frac{2}{15} = \frac{-1}{15}$

$\frac{\sqrt{15}}{15} = -\frac{\sqrt{15}}{15} = -0.2582$

$\frac{dy}{dx} = \tan\theta_2$

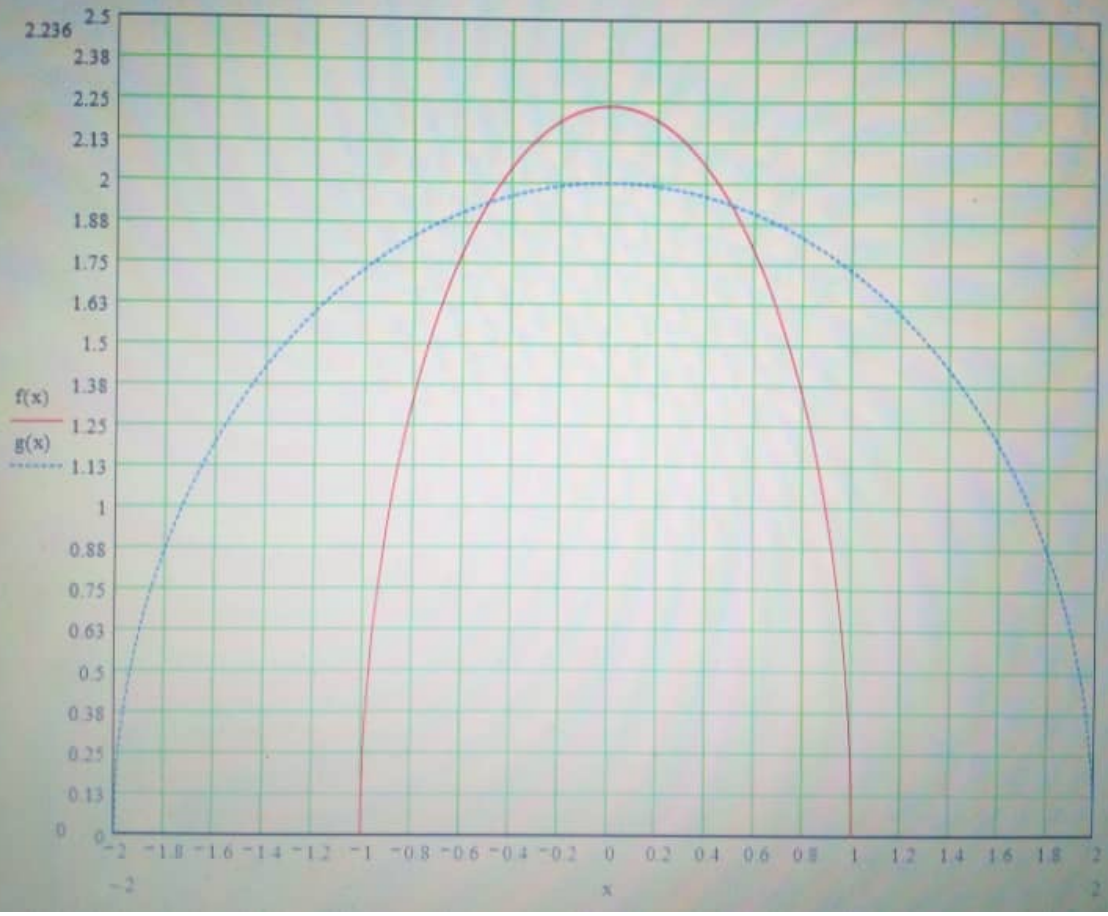
Co-ordinates of point of intersection $(x, y) = (\frac{1}{2}, \frac{15}{2}) = (0.5, 1.9365)$

Make y subject of formula
$5x^2 + y^2 = 5$
$y^2 = 5 - 5x^2$
$y = \sqrt{(5 - 5x^2)}$
$x^2 + y^2 = 4$
$y^2 = 4 - x^2$
$y = \sqrt{(4 - x^2)}$

Angle of intersection
Angle 1 (θ_1)
$5x^2 + y^2 = 5$
$10x + 2y\frac{dy}{dx} = 0$
$\frac{2y\,dy\,dx}{2y} = \frac{-10x}{2y}$

$\frac{dy}{dx} = \frac{-5x}{y}$, Sub x and y
$\frac{dy}{dx} = \frac{-5(\frac{1}{2})}{(\frac{\sqrt{15}}{2})} = -1.2910$

$\therefore \tan\theta_0 = -0.2582$
$\theta_2 = \tan^{-1} 0.2582$
$= 14.48°$
$\theta = \theta_2 - \theta_1$
$= -14.48° - (-52.24°)$
$= 37.76°$


2.236
2.5
2.38
2.25
2.13
2
1.88
1.75
1.63
1.5
1.38
1.25
1.13
1
0.88
0.75
0.63
0.5
0.38
0.25
0.13
0
f(x)
g(x)
-2 -1.8 -1.6 -1.4 -1.2 -1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2
-2
x
2