18/ENG04/038

Ezeigbo Chinenenye John

Elect/Elect

$5x^2+y^2=5$ ——— (1)

$x^2+y^2=4$ ——— (2)

Subtract (2) from (1)

$4x^2=1$

$x^2=1/4$

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

$x=1/2\ (0.5)$

Substitute x in equ (2)

$x^2+y^2=4$

$(1/2)^2+y^2=4$

$1/4+y^2=4$

$y^2=4-1/4$

$y^2=15/4$

$y=\sqrt{15/4}$

$y=\sqrt{15}/2\ (1.9365)$

Co-ordinates of intersection

$(1/2, \sqrt{15}/2), (0.5, 1.9365)$

To plot the graph we must make y the subject in both equations

$5x^2+y^2=5$

$\sqrt{y^2}=\sqrt{5-5x^2}$

$y=\sqrt{5-5x^2}$

$x^2+y^2=4$

$\sqrt{y^2}=\sqrt{4-x^2}$

$y=\sqrt{4-x^2}$

Angles of Intersection

Angle 1 (θ_1)

$5x^2+y^2=5$

$10x+2y\,dy/dx=0$

$2y\,dy/dx=-10x$

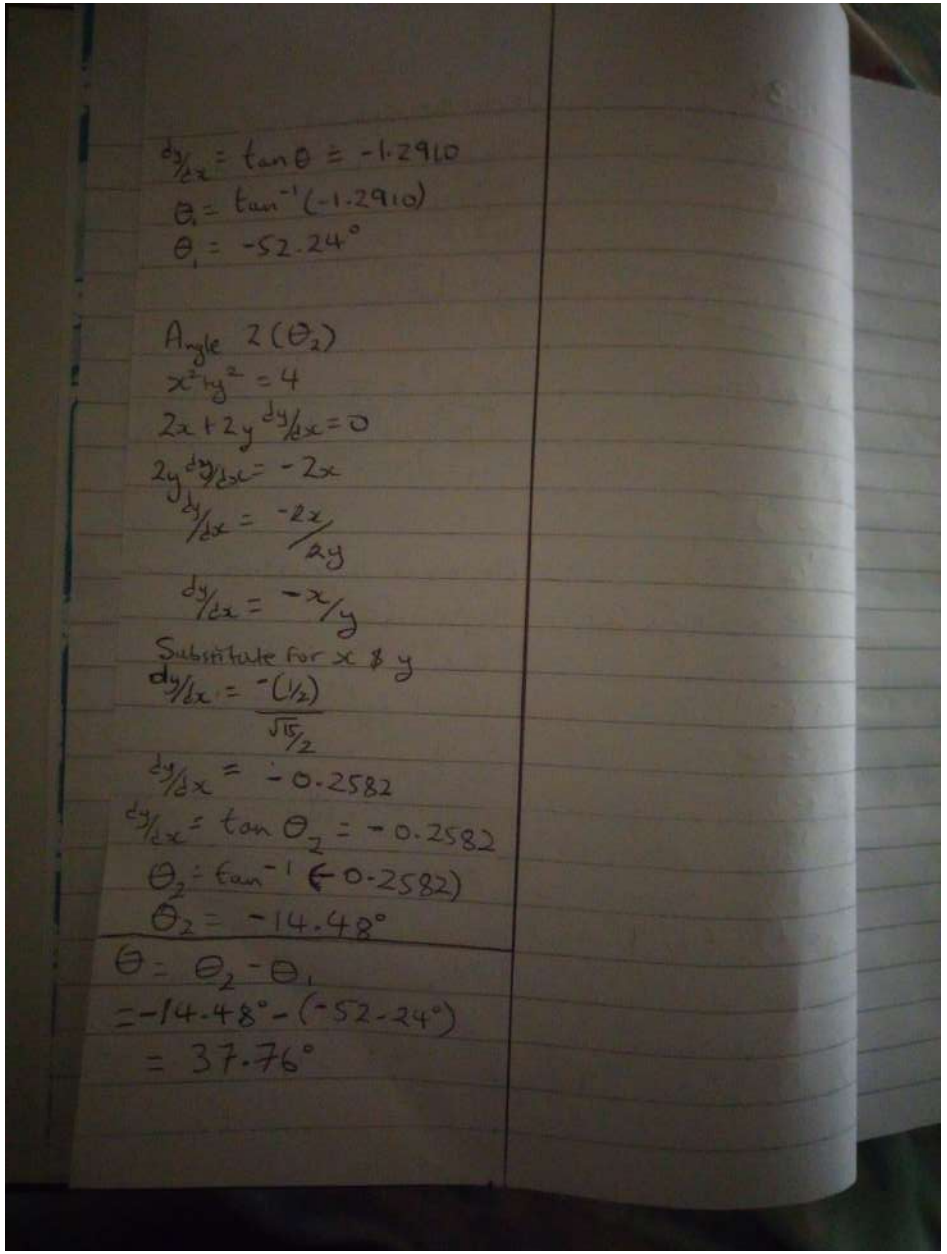
$dy/dx=\frac{-10x}{2y}$

$dy/dx=-5x/y$

Substitute x and y

$dy/dx=\frac{-5(1/2)}{(\sqrt{15}/2)}$

$=-1.2910$



$dy/dx = \tan\theta = -1.2910$

$\theta_1 = \tan^{-1}(-1.2910)$

$\theta_1 = -52.24°$

Angle 2 (θ_2)

$x^2 + y^2 = 4$

$2x + 2y\, dy/dx = 0$

$2y\, dy/dx = -2x$

$dy/dx = -2x/2y$

$dy/dx = -x/y$

Substitute for x & y

$dy/dx = -(1/2)/(\sqrt{15}/2)$

$dy/dx = -0.2582$

$dy/dx = \tan\theta_2 = -0.2582$

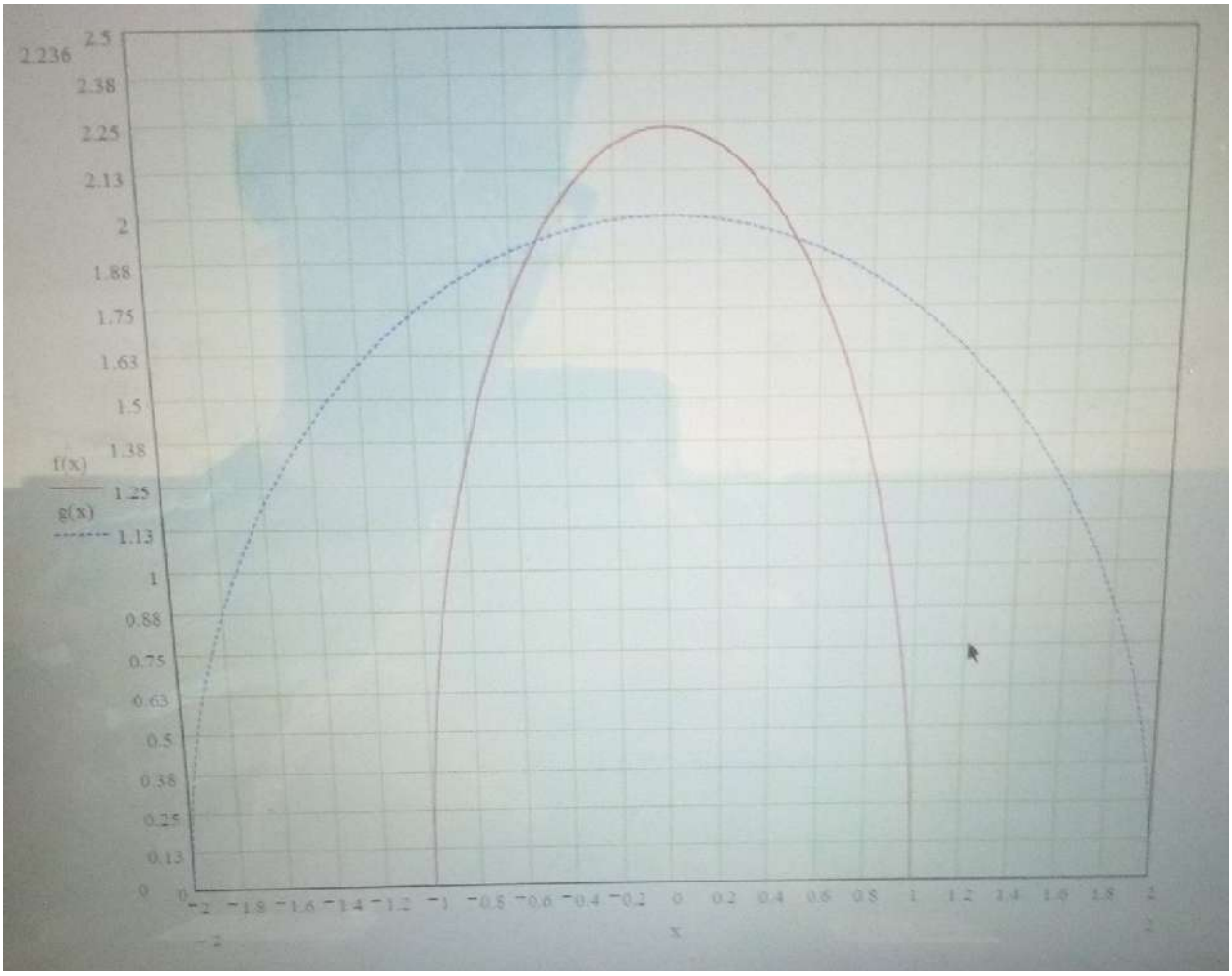
$\theta_2 = \tan^{-1}(-0.2582)$

$\theta_2 = -14.48°$

$\theta = \theta_2 - \theta_1$

$= -14.48° - (-52.24°)$

$= 37.76°$


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
x