Substitute x in eqn (ii)

$(\sqrt{1/4})^2 + y^2 = 4$

$1/4 + y^2 = 4$

$y^2 = 4 - 1/4$

$y^2 = \frac{16-1}{4} \Rightarrow y = \sqrt{\frac{15}{4}} = 1.9365$

$x^2 + y^2 = 4$

(differentiate)

$2x + 2y\frac{dy}{dx} = 0$

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

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

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

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

$\theta_2 = \tan^{-1}\left(-1/\sqrt{15}\right)$

$\theta_2 = -14.48$

| | |
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| Course | ENG 231 |

$x^2+y^2=4 \quad \ldots(i)$

$5x^2+y^2=4 \quad \ldots(ii)$

Solution

$y^2=5(1-x^2) \quad \ldots(iii)$

Substitute for $y^2$ in eqn(i)

$x^2+5(1-x^2)=4$

$x^2+5-5x^2=4$

$x^2-5x^2=-1$

$-4x^2=-1$

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

$x^2=1/4$

$x=\sqrt{1/4}$

$x=1/2$

Substitute $x=1/2$ into eqn(i)

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

$1/4+y^2=4$

$y^2=4-1/4$

$y^2=\frac{15}{4}$

$y=\sqrt{\frac{15}{4}}$

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

differentiate using Implicit differentiation

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

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

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

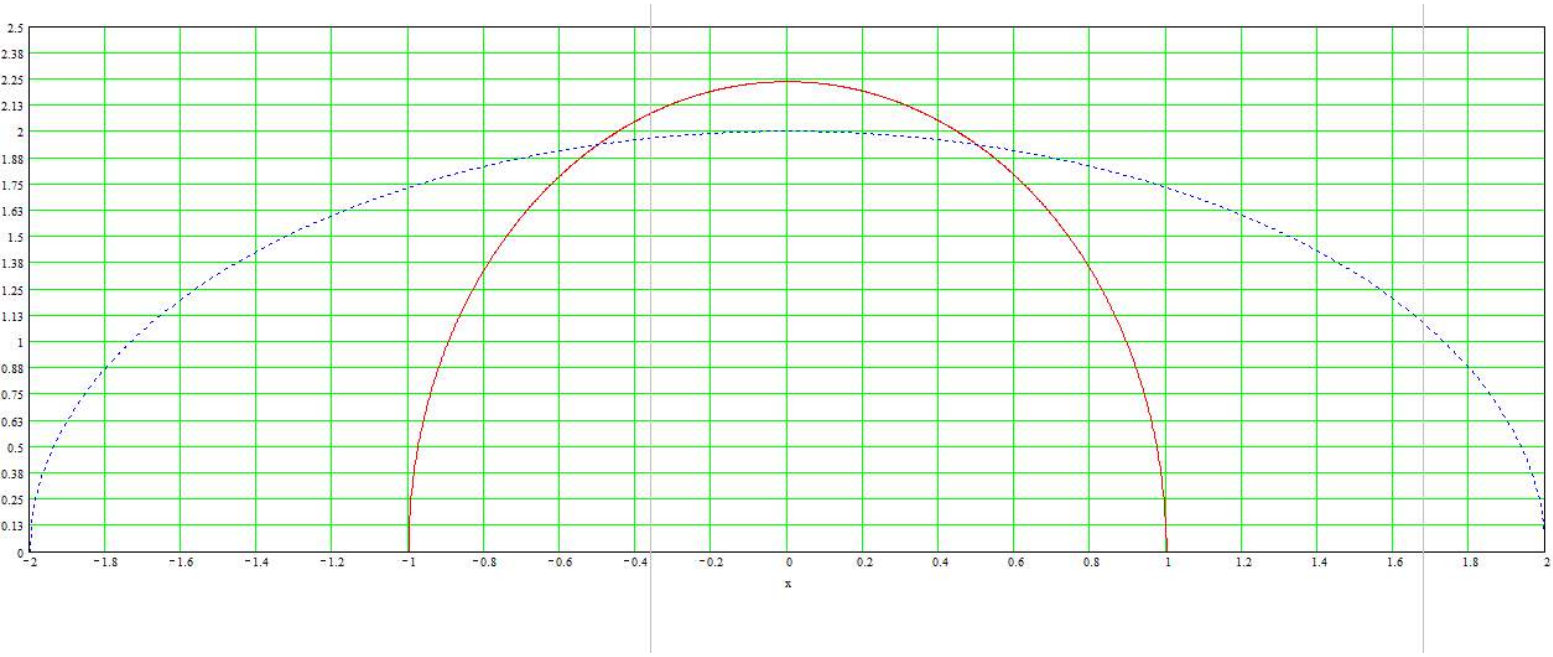
$\frac{dy}{dx}=\frac{-10(1/2)}{2(\sqrt{15}/4)}$

$\frac{dy}{dx}=\frac{-5}{\sqrt{15}}$

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

$\theta=\tan^{-1}-5/\sqrt{15}$

$\theta=-52.24$


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
−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