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ENG Mathematics Assignment 2

$y^2 = 5(1 - x^2)$ ... (i) using method point of
$x^2 + y^2 = 4$ ... (ii) intersection

$(-0.5, 1.97)$; $(0.5, 1.93)$

$y^2 = 5(1 - x^2)$ -- (i)

Sub for y^2 in eqn (ii)

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

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

$-4x^2 = 4 - 5$

$-4x^2 = -1$

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

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

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

differentiating implicitly,

$10x + 2y \frac{dy}{dx} = 0$

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

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

~~and $y = \sqrt{15}$~~

$y^2 = \sqrt{5(1 - 1/2^2)} =$

$y = \frac{\sqrt{15}}{2}$

$x = \frac{1}{2}$ and $y = \frac{\sqrt{15}}{2}$

$$\frac{dy}{dx} = \frac{-10\left(\frac{1}{x}\right)}{2\left(\frac{\sqrt{15}}{2}\right)}$$

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

$dy/dx = \tan\theta$

$$\theta = \tan^{-1}\left(\frac{-5}{\sqrt{15}}\right) = -52.24^{\circ}$$

Substituting x in eqn (ii)

$$\left(\frac{1}{2}\right)^2 + y^2 = 4$$

$$\frac{1}{4} + y^2 = 4$$

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

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

$x^2 + y^2 = 4$

differentiating implicitly,

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

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

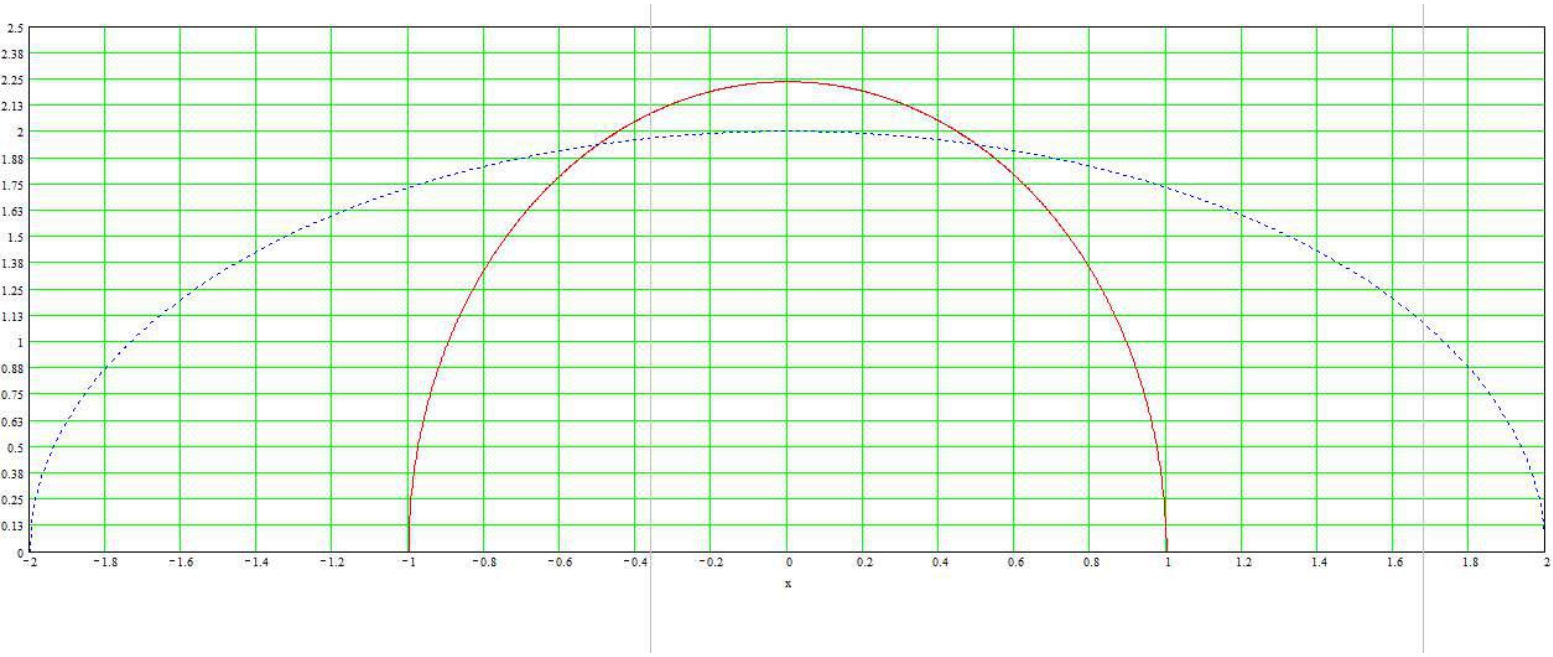
$$= \frac{-x\left(\frac{1}{x}\right)}{2\left(\frac{\sqrt{15}}{2}\right)}$$

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

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

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

$\theta_2 = -14.48$


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