



Circle with center at origin

$$h = 8 + 2(\sqrt{15})$$

$$h^2 + k^2 = 4$$

$$y^2 = 11 - \frac{1}{4}$$

$$y^2 = \frac{16-1}{4} = \frac{15}{4} = 1.9375$$

$$y^2 + 15 = 4$$

Integration

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

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

$$= -2(2) = -2$$

$$\frac{dy}{y} = \frac{1}{\sqrt{15}}$$

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

$$\theta_2 = -11.11^\circ$$

PETROLEUM - ENGINEERING

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

Using method of
Intersection

$(-0.5, 1.93) + (0.5, 1.93)$

$y^2 = 5(1-x^2)$ — (1)

Sub for y^2 in eqn (1)

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

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

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

$-4x^2 = -1$

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

$x = \pm \frac{1}{2}$

$x = \frac{1}{2}$

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

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

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

differentiate using implicit differentiation

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

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

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

$y \frac{dy}{dx} = -5x$

$\frac{dy}{dx} = -\frac{5x}{y}$

$\frac{dy}{dx} = -\frac{5(\frac{1}{2})}{1.93}$

$\frac{dy}{dx} = -\frac{2.5}{1.93}$

$\frac{dy}{dx} = -1.295$

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$\theta = \tan^{-1} \frac{y}{x} = \tan^{-1} \frac{1.93}{0.5} = 75.5^\circ$