Answer on Question #46769 – Math - Analytic Geometry

Problem.

Find the angle between the x-axis and the tangent to the hyperbola xy=9 at(3,3)

Solution:

The tangent to the function $y = f(x)$ at the point $(x_0, f(x_0))$ has equation
$y = f'(x_0)(x - x_0) + f(x_0)$.
Therefore the tangent to the hyperbola $xy = 9$ at $(3,3)$ has equation

$$y = -\frac{9}{3^2}(x - 3) + 3$$

or

$$y = -x + 6.$$

The tangent of the angle between the x-axis and line $y = -x + 6$ equals -1. Therefore the angle between this line equal $\arctan -1 = 135^\circ = \frac{3\pi}{4}$.

Answer: $135^\circ = \frac{3\pi}{4}$.