Implicit Differentiation Assignment

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Implicit Differentiation Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

For Questions 1-3, perform each of the following steps (follow Example 7).

- Calculate the derivative $\frac{dy}{dx}$, and plug in the given x- and y-values to get the slope, m.
- Calculate the line tangent to the curve at the given point (x_0, y_0): $TL(x) = y_0 + m \cdot (x - x_0)$.
- Graph the implicit function and the tangent line on the same window.

Question 1

$y^4 - 4y^2 - x^4 + 9x^2 = 0; \quad (0.5888, 1)$

Question 2

$x^3 + y^3 = 9xy; \quad (2, 4)$

Question 3

$(x^2+y^2-1)^3 = x^2y^3; \quad (1,1)$

Question 4

Consider the curves $y^2 = x^3$ and $2x^2+3y^2 = 5$.

Part a

Find $\frac{dy}{dx}$ for the first curve.

Part b

Find the tangent line to the first curve at $(1,1)$.

Part c

Find $\frac{dy}{dx}$ for the second curve.

Part d

Find the tangent line to the second curve at $(1,1)$.

[Make sure you give this tangent line a different name than the tangent line in Part b.]

Part e

Graph the two curves and the two tangent lines on the same axes (use red for the tangent lines).

[Notice that the two tangent lines are perpendicular.]