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Practice Problems

Name:_____
Period: _____ Date: _____

Form #103426174617
Step-By-Step
Answers
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Solve:

1) Find the equation of the tangent line to $y^4 = 4x^3 - 4x^2 + x + 15$ going through (1,2).

$4y^3 \cdot \frac{dy}{dx} = 12x^2 - 8x + 1$

$\frac{dy}{dx} = \frac{12x^2 - 8x + 1}{4y^3} = \frac{5}{32}$

$2 = \frac{5}{32} \cdot 1 + b$

$b = 59/32$

$y = \frac{5}{32}x + \frac{59}{32}$

2) Find the equation of the tangent line to $y^3 = 3x^3 + 4x^2$ going through (-1,1).

$3y^2 \cdot \frac{dy}{dx} = 9x^2 + 8x$

$\frac{dy}{dx} = \frac{9x^2 + 8x}{3y^2} = \frac{1}{3}$

$1 = \frac{1}{3}(-1) + b$

$b = \frac{4}{3}$

$y = \frac{1}{3}x + \frac{4}{3}$

3) Find the equation of the tangent line to $y^4 + xy = -x - 1$ going through (-1,1).

$4y^3 \cdot \frac{dy}{dx} + x \cdot \frac{dy}{dx} + y = -1$

$\frac{dy}{dx}(4y^3 + x) = -1 - y$

$\frac{dy}{dx} = \frac{-1 - y}{4y^3 + x} = \frac{-2}{3}$

$1 = \frac{-2}{3}(-1) + b$

$b = \frac{1}{3}$

$y = \frac{-2}{3}x + \frac{1}{3}$

4) Find the equation of the tangent line to $-3xy^2 + y^3 = -7$ going through (2,-1).

$-3x \cdot 2y \cdot \frac{dy}{dx} + y^2 \cdot -3 + 3y^2 \cdot \frac{dy}{dx} = 0$

$3y^2\frac{dy}{dx} - 6xy\frac{dy}{dx} = 3y^2$

$\frac{dy}{dx}(3y^2 - 6xy) = 3y^2$

$\frac{dy}{dx} = \frac{3y^2}{3y(y - 2x)} = \frac{y}{y - 2x} = \frac{-1}{-5} = \frac{1}{5}$

$-1 = \frac{1}{5} \cdot 2 + b$

$b = -\frac{7}{5}$

$y = \frac{1}{5}x - \frac{7}{5}$

5) Find the equation of the tangent line to $y^3 = 2x^2 - 3x - 4$ going through (-1,1).

$3y^2 \cdot \frac{dy}{dx} = 4x - 3$

$\frac{dy}{dx} = \frac{4x - 3}{3y^2} = \frac{-7}{3}$

$1 = \frac{-7}{3}(-1) + b$

$b = -\frac{4}{3}$

$y = \frac{-7}{3}x - \frac{4}{3}$

6) Find the equation of the tangent line to $y^3 = -5x + 32$ going through (1,3).

$3y^2 \cdot \frac{dy}{dx} = -5$

$\frac{dy}{dx} = \frac{-5}{3y^2} = \frac{-5}{27}$

$3 = \frac{-5}{27} \cdot 1 + b$

$b = 86/27$

$y = \frac{-5}{27}x + \frac{86}{27}$