

3.2 Implicit Differentiation

Calculus

Name: _____

CA #2

Find $\frac{dy}{dx}$.

1. $3y^5 = 2x^3 + y$

2. $\sin(x + y) = 3x$

3. $\cos\left(\frac{x}{y}\right) - x = 15$

4. $\sqrt{y} - \ln y = x + 8$

5. $x - 3y^2 = 6$

6. $6 - xe^{y^5} = 2x^{10}$

Find the equation of the tangent line at the given point.

7. $5x^3 - x = \ln(y)$ at $\left(\sqrt{\frac{1}{5}}, 1\right)$

8. $3y^4 = x^4 - 2x^3y^2$ at $(-1, 1)$

Find the equations of all horizontal and vertical tangent lines. Calculator allowed. Round to three decimals.

9. $2x^3 - 6x = 3y^2$

10. $3y^4 = 6x^4 + 3y$

Horizontal: _____

Horizontal: _____

Vertical: _____

Vertical: _____

Answers to 3.2 CA #2

1. $\frac{6x^2}{15y^4-1}$	2. $\frac{3}{\cos(x+y)} - 1$	3. $\frac{y^2 \csc(\frac{x}{y}) + y}{x}$	4. $\frac{2y}{\sqrt{y}-2}$
5. $\frac{1}{6y}$	6. $-\frac{20x^9 + e^{y^5}}{5xy^4e^{y^5}}$	7. $y - 1 = 2\left(x - \sqrt{\frac{1}{5}}\right)$	8. $y - 1 = -\frac{5}{4}(x + 1)$
9. Horizontal: $y = \pm\sqrt{\frac{4}{3}} \approx \pm 1.1547$ Vertical: $x = 0$ and $x = \pm\sqrt{3} \approx \pm 1.732$		10. Horizontal: $y = 0$ and $y = 1$. Vertical: NONE	