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ESP
Kouba
Worksheet 13 1/2

1.) Determine $y' = \dfrac{dy}{dx}$ for each.

a.) $x^2 - y^2 = 36$

b.) $\cos(xy^2) = y^3 + x$

c.) $(x-y)^4 = \tan(xy)$

d.) $\dfrac{x^2}{y^3+1} = \dfrac{x-1}{y+1}$

e.) $x \sin y + y \sin x = x + y$

f.) $\sqrt{1+\sqrt{1+\sqrt{1+y}}} = x^2 + \sec(3y)$

2.) Determine an equation of the line perpendicular to the graph of $(xy^3+y)^3 = x^2+27$ at $x=0$.

3.) Compute the slope and concavity of the graph of $y^3 + y^2 = xy + 2$ at the point where $y = 1$. Sketch the graph near this point.

4.) Determine an equation with graph passing through the point $(0,1)$ and satisfying $y' = \dfrac{1-2xy^2}{2x^2y-1}$ .

5.) The following equation represents a " tilted" ellipse. Use implicit differentiation to find the maximum and minimum y-values and maximum and minimum x-values on its graph. Sketch the graph of the ellipse : $2x^2 - xy + y^2 = 42$

6.) A sector of measure $\theta$ radians is removed from a circular piece of paper of radius 6 inches. What remains of the paper is formed into a right circular cone. Find $\theta$ which results in the cone of maximum volume.