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

$$\ln y = \frac{1}{2}\ln(x^2-1) - \frac{1}{2}\ln(x^2+1)$$

$$\frac{y'}{y} = \frac{1(2x)}{2(x^2-1)} - \frac{1(2x)}{2(x^2+1)}$$

$$y' = y\left[\frac{2x(x^2+1) - 2x(x^2-1)}{2(x^2-1)(x^2+1)}\right]$$

$$y' = \frac{(x^2-1)^{1/2}}{(x^2+1)^{1/2}}\left[\frac{x^3+x-x^3+x}{(x^2-1)^{1/2}(x^2+1)^1}\right]$$

$$y' = \frac{(2x)}{(x^2-1)^{1/2}(x^2+1)^{3/2}}$$

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$$x^2 - 3\ln y + xy^2 = 10$$

$$2x - \frac{3y'}{y} + x(2yy') + y^2 = 0$$

$$y\left(\frac{-3y'}{y} + 2xyy' = -2x - y^2\right)$$

$$-3y' + 2xy^2y' = -2xy - y^3$$

$$y'(-3 + 2xy^2) = -2xy - y^3$$

$$y' = \frac{-2xy - y^3}{-3 + 2xy^2}$$

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For AP prob.

$3x^2 \quad x \leq 1$

$ax - 3b \quad x > 1$

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$2x^2 - y^4 = 1$

$4x - 4y^3 y' = 0$

$\frac{4x}{4y^3} = \frac{4y^3 y'}{4y^3}$

$\boxed{\frac{x}{y^3} = y'}$

Tangent (1, 1)

1) Deriv. Gives us slope

2) use pt & slope

2) Slope: $y' = \frac{1}{1^3} = 1$

$1 = 1(1) + b$

$-1 \quad -1$

$0 = b$

$y = x$

Mar 1-10:06 AM

$e^0 = 1$

$\frac{d}{dx}(e^u) = u'e^u$

(22) $y = e^{-x^2}$ $y''(0)$

$y' = -2xe^{-x^2}$

$y'' = -2x(-2xe^{-x^2}) + -2e^{-x^2}$

$y''(0) = -2(0)(-2(0)e^{-0^2}) + -2e^{-0^2}$

$= 0 - 2e^0$

$= -2(1)$

$= -2$

Mar 1-10:10 AM

Locate relative extrema

$y = \ln(x^2 + 2x + 3)$

$y' = \frac{2x+2}{x^2+2x+3}$

set top $= 0$

$0 = 2x + 2$

$x = -1$

$y = \ln(1 - 2 + 3)$

$y = \ln 2$

$\approx .7$

$(-1, \ln 2)$

$-\infty < x < -1$ | $-1 < x < \infty$

$f'(-2) < 0$ | $+$

0

min

Mar 1-10:15 AM