

Check HW answers with someone
Write the number of any "problem" problems on the board

19 220
05 73
61
69 49
41

19 347
63
73

41) $y = \ln(x^3)$ *chain rule*
Find slope of tangent line @ (1,0)
 $y' = \frac{3x^2}{x^3} @ (1,0) \rightarrow m=3$

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

Let $x^2-1 = c$

$y' = \frac{x^2 c^{-1/2} + c^{1/2}}{x c^{1/2}}$

Factor a $c^{1/2}$ out of numerator.

$\frac{x^2 c^{-1/2} + c^{1/2}}{c^{1/2}} \rightarrow c^{1/2}(x^2-1+1)$

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

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

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

$y' = x c^{-1} + \frac{1}{x}$

$y' = \frac{x}{x} + \frac{1}{x} = \frac{2}{x}$

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

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

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

49) $y = \ln(x(x^2-1)^{1/2})$
OR use a log property...

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

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

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

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

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

65) $y = \ln \left| \frac{\cos x}{\cos x - 1} \right|$

$u = \frac{\cos x}{\cos x - 1}$

$u' = \frac{(\cos x)'(\cos x - 1) - \cos x(\cos x - 1)'}{(\cos x - 1)^2}$

$u' = \frac{-\sin x(\cos x - 1) + \cos x \sin x}{(\cos x - 1)^2}$

$u' = \frac{\sin x}{(\cos x - 1)^2}$

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

$y' = \frac{\sin x}{\cos x - 1}$

$y' = \frac{\sin x}{\cos x - 1} \cdot \frac{\cos x + 1}{\cos x + 1}$

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

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

Use log prop.
 $y = \ln \left| \frac{\cos x}{\cos x - 1} \right|$

$y = \ln(\cos x) - \ln|\cos x - 1|$

$y' = \frac{-\sin x}{\cos x} - \frac{-\sin x}{\cos x - 1}$

$y' = -\tan x + \frac{\sin x}{\cos x - 1}$

Ⓢ p.348

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

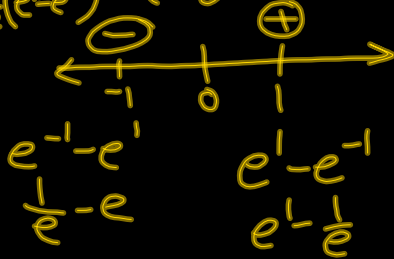
$$y' = \frac{1}{2}(e^x - e^{-x})$$

CRITICAL VALUES $\rightarrow y' = 0$ or dne

$$\frac{1}{2}(e^x - e^{-x}) = 0$$

$$e^x = e^{-x}$$

$$\frac{1}{2}(e^x - e^{-x}) \quad x=0$$



The derivative goes from negative to positive @ $x=0$.

$\therefore y = \frac{e^x + e^{-x}}{2}$ has a relative minimum @ $x=0$.

$$y = \frac{1}{2}(e^0 + e^0)$$
$$y = 1$$

Relative Minimum is located @ $(0, 1)$.

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

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

$$\frac{1}{2}(e^x + e^{-x}) = 0$$

$e^x = -e^{-x}$ never = 0 \therefore No points of inflection

① Write the answer to #49 p.322

② Use prop of logs to rewrite

$$y = \ln(x \sqrt[3]{x-2})$$

③ Find $f'(x)$ if $f(x) = (\ln x^2) \cdot e^{x^2}$