$y = \frac{8^x}{x^8} + \log_7 x$

$y' = \frac{x^8(8^x)\ln 8 - 8^x(8x^7)}{(x^8)^2} + \frac{1}{x\ln 7}$

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b) $y = x^{3/2}\tan\left(\frac{1}{x}\right)$

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

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$\lim_{x\to 1} \frac{1}{\ln x} - \frac{1}{x-1}$ $\frac{\infty}{\infty}$ or $\frac{0}{0}$

$\lim_{x\to 1} \frac{x-1-\ln x}{(\ln x)(x-1)}$ $\frac{0}{0}$

$\lim_{x\to 1} \frac{1-\frac{1}{x}}{(\ln x)(1)+(x-1)\left(\frac{1}{x}\right)}$ $\frac{0}{0}$

$\lim_{x\to 1} \frac{1-\frac{1}{x}}{\ln x + 1 - \frac{1}{x}}$ $\frac{x-1}{x}$

$(x-1)\frac{1}{x}$

$\frac{x}{x} - \frac{1}{x}$

$1 - \frac{1}{x}$

$\lim_{x\to 1} \frac{x^{-2}}{\frac{1}{x} + x^{-2}}$

$\lim_{x\to 1} \frac{\frac{1}{x^2}}{\frac{1}{x} + \frac{1}{x^2}} = \frac{1}{2}$

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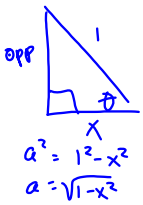
$\tan(\cos^{-1}\frac{x}{1})$

θ

$\tan\theta = \frac{\sqrt{1-x^2}}{x}$



$a^2 = 1^2 - x^2$

$a = \sqrt{1-x^2}$

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$y' = -\cos\theta - 2$

$F(x) = -\sin\theta - 2x + C$

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$y = \sinh(e^{2x})$

$y' = (\cosh(e^{2x}))(e^{2x})(2)$

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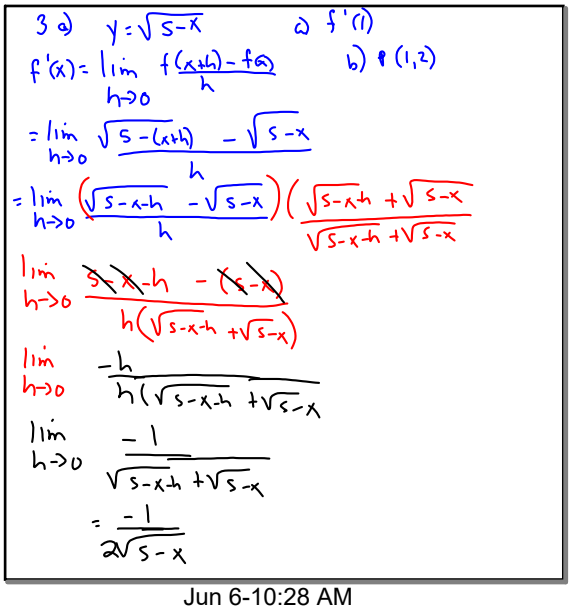

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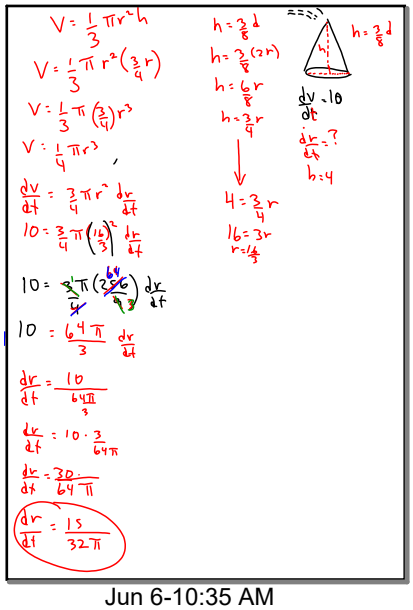

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