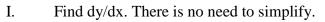
M53_LE5_001 Elementary Analysis I First Semester, AY 2012-2013



1.
$$y = \frac{[\cot^{-1}(5^{x})]^{2}}{1 - \cosh(\sqrt{x})}$$
(4 points)
2.
$$y = \frac{\sqrt[4]{x^{2} + 1}\cot^{3}(2x)}{\sinh^{-1}(x)}$$
 (Use logarithmic differentiation.)
(5 points)

$$3. \quad y = \left[\sec \frac{1}{x} \right]^{\sec^{-1}(e^{4x})}$$
(5)

1.
$$\lim_{x \to 1} \frac{(\log x)^2}{x^3 - 3x + 2}$$
 2. $\lim_{x \to \infty} (1 + \pi e^{-x})^{e^x}$

III. Perform the integration.

1.
$$\int \frac{2^{\sin x} \sin x + 3^{-\sin x} \sec x}{3^{-\sin x} \tan x} dx$$
(5 points)

2.
$$\int_{0}^{\ln 2} \tanh^{2} x dx$$
(4 points)
3.
$$\int \frac{x^{3} + x}{16x^{4} - 1} dx$$
(5 points)

At any point (*x*,*y*) on the curve, the tangent line has slope equal to $\frac{3}{\sqrt{4x-x^2}}$. If the point (1,0) lies on the curve, determine it IV. on the curve, determine its equation. (4 points)

Formulas:
 END OF EXAM

$$D_z(\sinh^{-1}x) = \frac{1}{\sqrt{x^2 + 1}}$$
 $1 - \tanh^2 x = \operatorname{sech}^2 x$
 $D_z(\cosh^{-1}x) = \frac{1}{\sqrt{x^2 + 1}}$
 $1 - \coth^2 x = -\operatorname{csch}^2 x$
 $D_z(\cosh^{-1}x) = \frac{1}{\sqrt{x^2 - 1}}$
 $\sinh(x \pm y) = \sinh x \cosh y \pm \sinh x \sinh y$
 $D_z(\cosh^{-1}x) = \frac{1}{\sqrt{x^2 - 1}}$
 $\cosh(x \pm y) = \cosh x \cosh y \pm \sinh x \sinh y$
 $D_z(\cosh^{-1}x) = \frac{1}{\sqrt{x^2 - 1}}$
 $\cosh(x \pm y) = \cosh x \cosh x$
 $D_z(\cosh^{-1}x) = \frac{1}{1 - x^2}, |x| < 1$
 $\cosh 2x = \cosh^2 x + \sinh^2 x = 1 + 2\sinh^2 x = 2\cosh^2 x - 1$
 $D_z(\cosh^{-1}x) = \frac{1}{1 - x^2}, |x| > 1$
 $\sinh^{-1}x = \ln(x + \sqrt{x^2 + 1})$
 $D_z(\cosh^{-1}x) = -\frac{1}{1 - x^2}, |x| > 1$
 $\cosh^{-1}x = \ln(x + \sqrt{x^2 - 1})$
 $D_z(\operatorname{csch}^{-1}x) = -\frac{1}{x\sqrt{1 - x^2}}$
 $\cosh^{-1}x = \frac{1}{2}\ln\left(\frac{1 + x}{1 - x}\right)$
 $D_z(\operatorname{csch}^{-1}x) = -\frac{1}{|x|\sqrt{x^2 - 1}}$
 $\cosh^{-1}x = \frac{1}{2}\ln\left(\frac{x + 1}{x - 1}\right)$
 $\int \frac{1}{\sqrt{u^2 - a^2}} du = \sinh^{-1}\left(\frac{u}{z}\right) + C = \ln(u + \sqrt{u^2 - a^2}) + C, u > a$
 $\operatorname{csch}^{-1}x = \ln\left(\frac{1 + \sqrt{1 - x^2}}{x}\right)$
 $\int \frac{1}{u^2 - a^2} du = \left\{\frac{1}{a} \tanh^{-1}\left(\frac{u}{z}\right) + C, |u| > a\right\} = \frac{1}{2a}\ln\left|\frac{a + u}{a - u}\right| + C$

Mathematics 53

Fifth Long Examination

UP SCHOOL OF STATISTICS STUDENT COUNCIL Education ESEARCH PHILOS SOPHIA

points)

(4 points each)

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END OF EXAM