

Homework 2 - Math 142**Name:** _____

Due by 5:00pm Friday, February 26. Send a PDF with your solutions to blins@hsc.edu.

1. Approximate the area under the curve $y = \frac{1}{x}$ from $x = 1$ to $x = 4$ using a Riemann sum with 100 rectangles. Give both the numerical result and the summation formula that you used to calculate the sum (I recommend using Desmos for this problem).
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2. Find $\frac{d}{dx} \ln(\ln x)$.
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3. Find $\frac{d}{dx} \ln \left(\frac{x^3 \sqrt{x+5}}{5^x} \right)$. Hint: Use the logarithm properties to simplify before differentiating.
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4. Use logarithmic differentiation to find $\frac{d}{dx} x^{-4x}$.
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5. Find $\int \frac{\cos \theta}{1 + \sin \theta} d\theta$.
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6. Find $\int_1^7 \frac{1}{x+2} dx$.

7. Find $\int_1^e \frac{(\ln x)^2}{x} dx$.

8. Compute the following without a computer:

(a) $\log_2(12) + \log_2(\frac{2}{3})$

(b) $\log_5(100) - \log_5(4)$

9. Solve the following equations for x .

(a) $\log_{10}(x) + \log_{10}(x) = 8$

(b) $\log_x(10) = 2$

10. Find these logarithms without a computer:

(a) $\log_2(8\sqrt{8})$

(b) $\log_{10}\left(\frac{1}{\sqrt{1,000,000}}\right)$
