

Exam 3

Student Name: _____

Student ID#: _____

Each problem is worth 6 points. Give a complete solution to receive the full credit!

1. Which of the following logarithms are defined?

(a) $\ln \log \left(\frac{1}{10}\right)^{-2}$

(b) $\log \sqrt{2}$

2. If $\log_a b = 8$, $a > 0$, $a \neq 1$, $b > 0$, find the value of $\log_a(ab^2)$.

3. Use implicit differentiation to find dy/dx of the curve $y^2 - \log x = 10$.

4. Find the derivative of the function $y(x) = 2^x + x^2$ with respect to x .

5. Evaluate indefinite integral.

$$\int \left(\sqrt[3]{x} + e^{\frac{1}{3}x} - \frac{\ln 2}{x} \right) dx$$

6. Evaluate indefinite integral.

$$\int \frac{x^2 - 7}{x} dx$$

7. Use substitution method to find the following integral

$$\int \frac{\ln^4(z)}{z} dz$$

8. Evaluate

$$\frac{d}{dx} \int_1^x \frac{t^1}{t^2 + 4} dt$$

9. Use integration by parts to evaluate definite integral.

$$\int_1^3 \log x \, dx$$

10. A graph of the affine function $y = -2x + 6$ forms a right triangle with the positive x -axis and positive y -axis. Find the area of that triangle using *The Fundamental Theorem of Calculus* and then verify your result using area formula $A = \frac{1}{2} b \cdot h$ from plain geometry