

MATH 160-03

NAME

EXAM 3

NOVEMBER 2, 1999

TO RECIEVE CREDIT YOU MUST SHOW YOUR WORK

1. (10) Find the derivative of each of the following:

a) $y = (x^3 + 7)^2 (x^4 + 9)$

b) $y = \frac{2x+3}{-4x+7}$

2. (5) Write $(e^{3x}e^{7x})^{\frac{1}{2}}$ in the form e^{kx} .

3. (10) Find the derivative of each of the following:

a) $y = e^{x^2+4x+8}$

b) $y = (e^{4x} + 4x)^3$

4. (10) Find the value of x at which $f(x) = (4 - 3x)e^{3x}$ has a possible relative maximum or minimum point. Use the second derivative to determine which.

5. (5) Give the definition of $\ln w$.

6. (10) Solve each of the following for x .

a) $3e^{7x} - 24 = 0$

b) $2 \ln x = 30$.

7. (10) Find the derivative of each of the following:

a) $y = 3 \ln(x^2 - 7x + 9)$

b) $y = x^3 \ln x$

8. (5) Simplify $e^{\ln x^2 + 3 \ln y}$

9. (5) Find the derivative of $y = \ln \left(\frac{(x^2 - 4)^3 e^{7x}}{4x + 6} \right)$.

10. (10) Approximately 500 bacteria are placed in a culture. Let $P(t)$ be the number of bacteria present in the culture after t hours. Suppose that $P(t)$ satisfies the differential equation $P'(t) = .3P(t)$.

a) How many bacterial are present after 5 hours?

b) When will the population double?

11. (10) Your parents bought 160 acres of farm land for \$200,000 in 1969. They sell the land this year for \$2,400,000. What rate of interest compounded continuously did this investment return?

12. (10) Find the following antiderivatives:

a) $\int 32x^3 - 24x^2 + 18x - 5 \, dx$

b) $\int e^{3x} + x^3 \, dx$