

Review 1 Fall 1992

1. Determine whether each of the following statements is TRUE or FALSE. Write your answer (the entire word TRUE or FALSE) on the first page of the blue book. There is no partial credit.

a) The inverse of  $y = \sqrt{x} + 1$  is  $y = x^2 - 2x - 2$

b)  $\sec(\sin^{-1}(\frac{4}{5})) = \frac{5}{3}$

c)  $\cos^{-1}(0) = -\frac{\pi}{2}$

d)  $x^2 + 2^x$  grows faster than  $3^x$

e)  $\ln 36 = 2 \ln 2 + \ln 3$

f)  $e^{2 \ln x - \ln(\frac{1}{x})} = x^3$

For the remaining questions, all work must be shown.

2. Find  $\frac{dy}{dx}$ . Your answer may be in terms of  $x$  and  $y$ .

a)  $y = \sin^{5x} + \ln(5^x)$

b)  $y^2 = \frac{(x^2 + 1)^3}{\sqrt{x - 3}(7x)^{10}}$

c)  $y = e^{e^{x^2}}$

d)  $y = \tan^{-1}(3x^2)$

3.

a)  $\int_{-\frac{1}{5}}^0 \frac{dx}{\sqrt{1 - 25x^2}}$

b)  $\int \frac{e^{2x}}{1 + 4e^{2x}} dx$

c)  $\int \frac{dx}{x(\ln \sqrt{x})^2}$

d)  $\int \frac{17dx}{e^{3x}}$

4.

Find

$$\lim_{x \rightarrow 0} (e^{2x} + 2x)^{\frac{1}{\sin x}}$$

5. Find the area of the triangular region bounded by the curves  $y = (\frac{1}{3})^x$ ,  $y = 3^x$  and the line  $x = \log_3 2$ . Your final answer should be expressed using only natural logarithms.
6. 40% of a certain radioactive substance has decayed in 2 years. How much is left in 4 years if it starts out at 1000 gms? Simplify your answer.