

**MAT 122 – 001**  
**Spring 2008**  
**Test Three**  
**Calculators may not be used**

Differentiate (problems 1 – 3)

1.  $y = xe^{-1/x}$ .

2.  $y = \sqrt{\ln \sqrt{x}}$ .

3.  $y = \frac{(x^2 + 1)^4}{(2x + 1)^3 (3x - 1)^5}$ .

Integrate (problems 4 – 6)

4.  $\int \frac{\cos(\ln x)}{x} dx$ .

5.  $\int e^{\tan x} \sec^2 x dx$ .

6.  $\int \frac{x+1}{x^2+2x} dx$ .

Determine the limit (problems 7 & 8)

7.  $\lim_{x \rightarrow 0^+} x^2 \ln x.$

8.  $\lim_{x \rightarrow 0} (\cos 3x)^{5/x}$