

## Calculus Self-Test for Stat 509/Econ 580

This will not be graded, though you will be expected to turn it in during the quiz section tomorrow.

If you have difficulty answering two or more of these problems, then you should review calculus and/or contact the TA as soon as possible.

1. Integrate  $e^{-ax-b}$  for  $x \in (1, 2)$ .
2. Find  $\frac{\partial f}{\partial x}$  when  $f(x, y) = x^2y \ln x$ .
3. Write

$$\sum_{x=0}^{\infty} \frac{\lambda^x}{x!}$$

in a simpler form.

4. If  $f(x, \beta) = (x/\beta^2)e^{-x/\beta}$ , find  $\ln f(x, \beta)$ . Use this to find  $\frac{\partial}{\partial \beta} \ln f(x, \beta)$ .
5. Integrate  $xe^{-\lambda x}$  from 0 to  $\infty$ , where  $\lambda > 0$ .
6. Write (a)  $\sum_{n=0}^{\infty} x^n$ , (b)  $\sum_{n=2}^{\infty} x^n$  and (c)  $\sum_{n=1}^{\infty} nx^{n-1}$  in simpler form ( $|x| < 1$ ).
7. Calculate

$$\int_0^2 \int_0^y dx dy.$$

Hint: draw a picture.

8. Find the values of  $x$  corresponding to stationary points of the function

$$f(x) = x^3 - 3x + 2.$$

Find the value that the function takes at each of these points. Describe each stationary point.

9. If  $0 < a < 1$ , what is (a)  $\lim_{n \rightarrow \infty} a^n$  (b)  $\lim_{n \rightarrow \infty} a^{-n}$  ?
10. What is  $\lim_{n \rightarrow \infty} (1 + \frac{a}{n})^n$  ?