EMCF 31

Log into CourseWare at http://www.casa.uh.edu
and access the answer sheet by clicking on the EMCF tab.

NOTE: On all problems, choice F is "None of the above".

Important Facts: Aside from L 'Hospital's rule, you can take advantage of the following information:

- e^x grows much faster than any power of x as $x \to \infty$. i.e. $\lim_{x\to\infty} \frac{e^x}{x^n} = \infty$ and $\lim_{x\to\infty} \frac{x^n}{e^x} = 0$ for every value of n (even extremely large values!!).
- $\ln(x)$ grows much slower than any power of x as $x \to \infty$. $\lim_{x\to\infty} \frac{\ln(x)}{x^r} = 0$ and $\lim_{x\to\infty} \frac{x^r}{\ln(x)} = \infty$ for any value of $r > 0$ (even very small values!!).
- A limit that is ∞, is one that **does not exist**.

1. $\lim_{x\to\infty} \frac{3x^3 + 2x^2}{e^x} =$
   a. 3
   b. 2
   c. 1
   d. 0
   e. DNE

2. $\int_0^4 \frac{dx}{x-2}$ is an improper integral.

   A. True
   B. False

3. $\int_2^6 \frac{dx}{x-2}$ is an improper integral.

   A. True
   B. False

4. $\int_{-\infty}^{2} e^{3x}\,dx$ is an improper integral.

A. True
B. False

5. $\left\{\frac{n^{124}}{5^n}\right\}_{n=1}^{\infty}$

A. Converges
B. Diverges

6. Evaluate $\int_0^{\infty} \frac{1}{x^2+4}\,dx$.

A. $\pi/2$
B. $\pi/4$
C. 2π
D. The improper integral is divergent.

7 $\lim_{x \to \frac{1}{2}\pi^-} (\tan x)^{\cos x} =$

A. 0
B. 1
C. e
D. ∞

8. Does $\int_1^{\infty} \frac{1}{x}\,dx$ converge or diverge?

C. Converge D. Diverge

9. Does $\int_1^{\infty} \frac{1}{x^2}\,dx$ converge or diverge?

C. Converge D. Diverge

10. Does the sequence $\left\{\frac{1}{n}\right\}_1^{\infty}$ converge or diverge?

C. Converge D. Diverge