


Put answers on a separate piece of paper. Label each Section. Show all work for Free Response questions.

Quick Quiz for AP* Preparation: Sections 8.1 and 8.2

 You should solve the following problems without using a graphing calculator.

1. **Multiple Choice** Which of the following gives the value of

$$\lim_{x \rightarrow 0} \frac{(x+1)^{4/3} - (4/3)x - 1}{x^2}?$$

- (A) $-1/3$ (B) 0 (C) $2/9$
(D) $4/9$ (E) Does not exist
2. **Multiple Choice** Which of the following gives the value of $\lim_{x \rightarrow 0^+} (3x^{2^x})$?
- (A) 0 (B) 1 (C) 2
(D) 3 (E) Does not exist

3. **Multiple Choice** Which of the following gives the value of


$$\lim_{x \rightarrow 2} \frac{\int_2^x \sin t \, dt}{x^2 - 4}?$$

- (A) $-\frac{\sin 2}{4}$ (B) $\frac{\sin 2}{4}$ (C) $-\frac{\sin 2}{2}$
(D) $\frac{\sin 2}{2}$ (E) Does not exist

4. **Free Response** The second and fifth terms of a geometric sequence are -4 and $1/2$, respectively. Find

- (a) the first term, (b) the common ratio,
(c) an explicit rule for the n th term, and
(d) a recursive rule for the n th term.

Quick Quiz for AP* Preparation: Sections 8.3 and 8.4

 You may use a graphing calculator to solve the following problems.

1. **Multiple Choice** Which of the following functions grows faster than x^2 as $x \rightarrow \infty$?

(A) e^{-x} (B) $\ln(x)$ (C) $7x + 10$ (D) $2x^2 - 3x$ (E) $0.1x^3$

2. **Multiple Choice** Find all the values of p for which the

integral converges $\int_1^{\infty} \frac{dx}{x^{p+1}}$.

- (A) $p < -1$ (B) $p < 0$ (C) $p > 0$
(D) $p > 1$ (E) diverges for all p

3. **Multiple Choice** Find all the values of p for which the

integral converges $\int_0^1 \frac{dx}{x^{p+1}}$.


- (A) $p < -1$ (B) $p < 0$ (C) $p > 0$
(D) $p > 1$ (E) diverges for all p

4. **Free Response** Consider the region R in the first quadrant under the curve $y = \frac{2 \ln(x)}{x^2}$.

- (a) Write the area of R as an improper integral.
(b) Express the integral in part (a) as a limit of a definite integral.
(c) Find the area of R .

Ch 8 Review Section

AP* Examination Preparation

 You should solve the following problems without using a graphing calculator.

56. Consider the infinite region R in the first quadrant under the curve $y = xe^{-x^2}$.
- (a) Write the area of R as an improper integral.
(b) Express the integral in part (a) as a limit of a definite integral.
(c) Find the area of R .
57. The infinite region in the first quadrant bounded by the coordinate axes and the curve $y = \frac{1}{x} - 1$ is revolved about the y -axis to generate a solid.
- (a) Write the volume of the solid as an improper integral.
(b) Express the integral in part (a) as a limit of a definite integral.
(c) Find the volume of the solid.
58. Determine whether or not $\int_0^{\infty} xe^{-x} dx$ converges. If it converges, give its value. Show your reasoning.