

NAME _____

STUDENT ID _____

REC. INSTR. _____ REC. TIME. _____

INSTRUCTOR _____

INSTRUCTIONS:

1. Make sure that you have all 7 test pages.
 2. Fill in the information requested above and on the answer sheet.
 3. Mark the letter of your response for each question on the mark-sense answer sheet.
 4. There are 10 problems worth 9 points each, and 2 worth 5 points each for a total of 100 points.
 5. No books or notes or calculators may be used.
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1. Suppose R is the region between the graphs of $y = e^{(-x^2)}$ and $y = 1$, above the interval $0 \leq x \leq 1$. Find the volume of the solid obtained by revolving R about the y axis.

A. $2\pi - \frac{\pi}{e}$

B. $\pi + \frac{\pi}{e}$

C. $\pi - \frac{\pi}{e}$

D. $\frac{\pi}{e}$

E. $\pi + \frac{2\pi}{e}$

2. Find the length of the curve $y = 2x^{\frac{3}{2}}$ for $0 \leq x \leq \frac{1}{3}$.

A. $\frac{7}{27}$

B. $\frac{7}{9}$

C. $\frac{14}{27}$

D. $\frac{2}{9}$

E. $\frac{16}{27}$

3. Suppose that a force of 2 lbs is needed to stretch a spring $\frac{1}{2}$ ft. beyond its natural length. Calculate the work required to stretch it an additional $\frac{1}{2}$ ft.

A. $\frac{3}{2}$ ft-lbs

B. 2 ft-lbs

C. $\frac{1}{2}$ ft-lbs

D. 1 ft-lb

E. 3 ft-lbs

4. A plate occupies the part of the first quadrant between the lines $y = 2x$ and $y = 4$. Find the x coordinate of center of gravity.

A. 1

B. $\frac{2}{3}$

C. $\frac{4}{3}$

D. $\frac{3}{2}$

E. $\frac{1}{2}$

5. If the third Taylor polynomial of a given function $f(x)$ is $p_3(x) = 1 - x + \frac{x^2}{3} + \frac{x^3}{2}$ then the values of $f''(0)$ and $f'''(0)$ are, respectively

A. $\frac{2}{3}$ and 3

B. $\frac{1}{3}$ and $\frac{1}{2}$

C. $\frac{2}{3}$ and $\frac{1}{2}$

D. $\frac{1}{6}$ and 3

E. both are 3

6. $\lim_{m \rightarrow \infty} \frac{\sqrt{m^2 + m - 1}}{2m - 1} =$

A. ∞

B. 2

C. 1

D. $\frac{1}{2}$

E. 0

7. $\lim_{k \rightarrow \infty} (\sqrt{k+5} - \sqrt{k}) =$

- A. $-\frac{1}{2}$
- B. 0
- C. 1
- D. $\sqrt{5}$
- E. ∞

8. $\sum_{n=0}^{\infty} \frac{3^{n-2}}{4^{n+1}} =$

- A. $\frac{1}{4}$
- B. $\frac{1}{9}$
- C. $\frac{3}{16}$
- D. 1
- E. the series diverges

9. The series $\sum_{n=1}^{\infty} \frac{1}{2n - \sqrt{n}}$

- A. converges by the integral test
- B. converges by the limit comparison test
- C. converges by the alternating series test
- D. diverges by the ratio test
- E. diverges by the limit comparison test

10. Which of the following series converges?

- I. $\sum_{n=1}^{\infty} (-1)^n \frac{n+1}{n}$;
- II. $\sum_{n=0}^{\infty} \frac{2^n}{n!}$;
- III. $\sum_{n=0}^{\infty} e^n$

- A. only I
- B. only II
- C. only III
- D. only I and II
- E. none of the
series converge

11. The series $\sum_{n=1}^{\infty} \frac{(-1)^n}{2n+1}$

- A. diverges
- B. converges absolutely
- C. converges conditionally

12. The series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n\sqrt{n}}$

- A. diverges
- B. converges absolutely
- C. converges conditionally