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CALCULUS I – Worksheet #26

1. Find the area between the following curves: $y = \sqrt[3]{x}$ $y = x$ **1/2**

2. Use four "left-endpoint" rectangles to approximate $\int_0^4 x^2 + 1 \, dx$

   •A) 18 B) 21 C) 24 D) 25 E) 26

3. The average value of f(x) = tan x on the interval $\left[0, \frac{p}{4}\right]$ is

   A) $-\frac{1}{2} \ln 2$ B) $\frac{4}{p}$ •C) $\frac{\ln 4}{p}$ D) $\frac{p}{2 \ln 2}$ E) $\frac{1}{2}$

4. $\int_1^2 \frac{x^2 - 1}{x + 1} \, dx =$ •A) $\frac{1}{2}$ B) 1 C) ln 3 D) $\frac{5}{2}$ E) 2

5. Calculate the area between the parabolas $y = 25 - x^2$ and $y = x^2 - 25$.

   A) $\frac{250}{3}$ B) $\frac{500}{3}$ •C) $\frac{1000}{3}$ D) $\frac{1000}{6}$ E) $\frac{250}{6}$

6. Find the value of k such that the following function is continuous for all real numbers.

   $f(x) = \begin{cases} kx - 1 & \text{for } x < 2 \\ kx^2 & \text{for } x \geq 2 \end{cases}$ A) 1 B) $\frac{1}{2}$ C) $-\frac{1}{6}$ •D) $-\frac{1}{2}$ E) none of these

7. The area enclosed by the graphs of $y = x^2$ and $y = 2x + 3$ is

   A) $\frac{38}{3}$ B) $\frac{40}{3}$ C) $\frac{34}{3}$ D) $\frac{16}{3}$ •E) $\frac{32}{3}$

8. Find the area between the curve y = sin 3x and the x-axis (y = 0) from x = 0 to $x = \frac{p}{3}$.

   A) $\frac{1}{3}$ •B) $\frac{2}{3}$ C) 1 D) 2 E) 6

9. The area between the curves $x + 2 = y^2$ and y = x is given by

   •A) $\int_{-1}^{2} y - (y^2 - 2) \, dy$ B) $\int_{-1}^{2} (y^2 - 2) - y \, dy$ C) $\int_{-2}^{1} y - (y^2 - 2) \, dy$ D) $\int_{-1}^{2} \sqrt{x + 2} - x \, dx$ E) none

10. Given the function $f(x) = e^{x/2}$ on the closed interval [–1,4], if c is the number guaranteed by the mean value theorem, then c (correct to three decimal places) is ***(Calculator)***

    A) 0.998 B) 1.163 •C) 1.996 D) 2.065 E) 2.325

11. $\int_1^4 \frac{5x^2 - x}{2\sqrt{x}} \, dx =$ A) 29 B) $\frac{113}{6}$ •C) $\frac{86}{3}$ D) $\frac{311}{12}$ E) $\frac{110}{3}$

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12. For what value of c is $f(x) = \begin{cases} 3x^2 + 2, & x \geq -1 \\ -cx + 5, & x < -1 \end{cases}$ continuous ?

A) 3 B) –3 C) 6 D) none • E) 0