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CALCULUS I – Worksheet #27 Test Tomorrow!!!

1. Sand is falling into a conical pile at the rate of $10\frac{m^3}{sec}$ such that the height of the pile is always half the diameter of the base of the pile. Find the rate at which the height of the pile is changing when the pile is 5 m. high. $\left(V = \frac{1}{3}\pi r^2 h\right)$

   A) $\frac{1}{25\pi}$ m/s •B) $\frac{2}{5\pi}$ m/s C) $\frac{4}{5\pi}$ m/s D) $\frac{8}{5\pi}$ m/s E) 250 m/s

2. Let A be the region completely bounded by y = ln x + 2 and y = 2x. correct to three decimal places, the area of A is approximately ***(Calculator)***

   A) 0.053 •B) 0.162 C) 0.203 D) 1.216 E) 2.358

3. The area between the curve $y = 4 - x^2$ and the x-axis is

   A) $\frac{16}{3}$ B) $\frac{19}{3}$ C) $\frac{20}{3}$ D) $\frac{25}{3}$ •E) $\frac{32}{3}$

4. The average value of the function f(x) = x sin x on the closed interval [1,π] is approximately

   •A) 1.326 B) 1.467 C) 2.840 D) 3.142 E) 4.076 ***(Calculator)***

5. The area between the line y = 9x and the parabola $y = x^2$ is

   •A) $\frac{243}{2}$ B) $\frac{25}{6}$ C) $\frac{243}{4}$ D) $\frac{25}{3}$ E) 243

6. The area between the curve $y^2 = 4x$ and the line y = x is given by

   A) $\int_0^4 x - 2\sqrt{x}\ dx$ B) $\int_{-4}^4 2\sqrt{x} - x\ dx$ C) $\int_0^4 \frac{1}{4}y^2 - y\ dy$ D) $\int_{-4}^4 \frac{1}{4}y^2 - y\ dy$ •E) $\int_0^4 y - \frac{1}{4}y^2\ dy$

7. The average value of $f(x) = xe^{x^2}$ on the interval [0,2] is

   A) $\frac{1}{2}[e^4 - 1]$ B) $e^4 - 1$ •C) $\frac{1}{4}[e^4 - 1]$ D) e^4 E) $2[e^4 - 1]$

8. For $f(x) = x^2 - 8x$ on [0,8] a value for c, as prescribed by Rolle's Theorem, is

   A) 0 •B) 4 C) $\frac{1}{2}$ D) 8 E) 10

9. Use the trapezoidal rule to approximate the value of the integral $\int_1^{10} x^2\ dx$ with n = 9. **$\frac{669}{2}$**

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

    $f(x) = \begin{cases} 3kx - 5 & \text{for } x > 2 \\ 4x - 5k & \text{for } x \le 2 \end{cases}$ A) 3 •B) $\frac{13}{11}$ C) $\frac{3}{11}$ D) $-\frac{3}{11}$ E) −3