CALCULUS I – Worksheet #48

1. A particle moves in a straight line with velocity $v(t) = t^2$.
How far does the particle move between times t = 1 and t = 2?
A) $\frac{1}{3}$ B) $\frac{7}{3}$ C) 3 D) 7 E) 8

2. The acceleration α of a body moving in a straight line is given in terms of time t by $\alpha = 8 - 6t$.
If the velocity of the body is 25 at t = 1 and if s(t) is the distance of the body from the origin at time t, what is s(4) – s(2)? A) 20 B) 24 C) 28 D) 32 E) 42

3. Given the function defined by $f(x) = 3x^5 - 20x^3$, find all values of x for which the graph of f is concave up. A) $x > 0$ B) $-\sqrt{2} < x < 0$ or $x > \sqrt{2}$ C) $-2 < x < 0$ or $x > 2$ D) $x > \sqrt{2}$ E) $-2 < x < 2$

4. A point moves in a straight line so that its distance at time t from a fixed point of the line is $8t - 3t^2$. What is the total distance covered by the point between t = 1 and t = 2? A) 1 B) $\frac{4}{3}$ C) $\frac{5}{3}$ D) 2 E) 5

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

6. The average value of $\sqrt{x}$ over the interval $0 \quad x \quad 2$ is
A) $\frac{1}{3}\sqrt{2}$ B) $\frac{1}{2}\sqrt{2}$ C) $\frac{2}{3}\sqrt{2}$ D) 1 E) $\frac{4}{3}\sqrt{2}$

7. If $\frac{dy}{dx} = 4y$ and if y = 4 when x = 0, then y =
A) $4e^{4x}$ B) e^{4x} C) $3 + e^{4x}$ D) $4 + e^{4x}$ E) $2x^2 + 4$