OmniTest Ch. 6

1. Evaluate $\int_{\pi/16}^{\pi/8} \sqrt{1 + \cos 8x}\, dx$.

   A) $\frac{1}{4}$ B) $\frac{\sqrt{2} - 1}{4}$ C) $\frac{1 - \sqrt{2}}{4}$ D) $-\frac{1}{4}$

2. Evaluate $\int e^{6x}\sqrt{4 + 2e^{6x}}\, dx$.

3. Evaluate $\int_{-\sqrt{3}}^{\sqrt{3}} \frac{dx}{\sqrt{4 - x^2}}$.

   A) $\frac{2\pi}{3}$ B) π C) $\frac{7\pi}{12}$ D) $\frac{5\pi}{6}$

4. Evaluate $\cot^{-1}(\sqrt{3})$.

   A) $\frac{\pi}{3}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$

5. Evaluate $\int_{-1}^{0} \frac{5x^4 dx}{1 + x^{10}}$.

6. True or False: If $y = \cos^{-1}(-3x^2)$, then $\frac{dy}{dx} = \frac{6x}{\sqrt{1 - 9x^4}}$.

7. A colony of bacteria is grown under ideal conditions in a laboratory so that the population increases exponentially with time. At the end of 3 hours there are 1000 bacteria. At the end of 5 hours there are 4000. True or False: There were 250 bacteria present initially.

8. Evaluate $\int_0^1 3^{3x} dx$.

   A) $\frac{78}{\ln 3}$ B) $\ln 3$ C) $\frac{26}{3 \ln 3}$ D) $\frac{26}{3} \ln 3$

9. If $y = x^4 e^{4x^2}$, find $\frac{dy}{dx}$.

10. Evaluate $\int_0^{\ln 40} \frac{e^x dx}{1 + 2e^x}$.

    A) $\frac{3}{4} \ln 3$ B) $2 \ln 3$ C) $\ln 3$ D) $\frac{3}{2} \ln 3$