MAC 2312 and MAC 2282 Embedded Questions

MULTIPLE CHOICE. Please circle the one that best completes the statement.

1. Revolve the region bounded by $y = 2x^2$ and $y = 2\sqrt{x}$ about the x-axis. Find the volume of the solid obtained.

   (A) $\dfrac{3\pi}{5}$ (B) $\dfrac{6\pi}{5}$ (C) $\dfrac{3\pi}{2}$ (D) $\dfrac{3\pi}{10}$ (E) none of the above

2. Suppose that a spring has a natural length of 10 cm, and that 3 J of work is needed to stretch the spring from a length of 20 cm to a length of 30 cm. How far beyond its natural length will a force of 40 N keep the spring stretched?

   (A) 10 cm   (B) 20 cm   (C) 30 cm   (D) 40 cm   (E) none of the above

3. Determine the integral $\displaystyle\int \frac{3x^3 + 3x^2 + 2}{x^2 + x}\,dx$.

   (A) $\dfrac{3}{2}x^2 - 2\ln|x+1| + 2\ln|x| + C$ (B) $\dfrac{3}{2}x^2 + 2\ln|x-1| - 2\ln|x| + C$ (C) $3x^2 + 2\ln|x+1| - 2\ln|x| + C$

   (D) $2\ln|x+1| - 2\ln|x| + C$ (E) none of the above

4. Find the integral $\displaystyle\int_0^8 \frac{81\,dx}{(81 - x^2)^{3/2}}$.

   (A) $\dfrac{8}{\sqrt{17}}$ (B) $\dfrac{1}{\sqrt{17}}$ (C) $17^{3/2}$ (D) $17 - \sqrt{17}$ (E) none of the above

5. Find the sum of the series $\displaystyle\sum_{n=0}^{\infty} \frac{1 - (-1)^n}{3^n}$.

   (A) $\dfrac{3}{4}$ (B) $\dfrac{3}{5}$ (C) $\dfrac{3}{8}$ (D) $\dfrac{3}{10}$ (E) none of the above