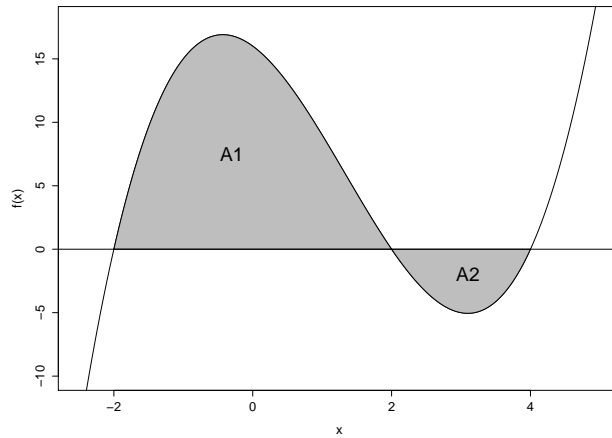


MA 23200 - Practice Exam 1

1. The graph of $y = f(x)$ is shown in the figure below. A_1 and A_2 are positive numbers that represent the area of the shaded regions from -2 to 2 and from 2 to 4 respectively. In terms of A_1 and A_2 , $\int_{-2}^2 f(x)dx - 2 \int_2^4 f(x)dx =$



- A. $A_1 - A_2$
B. $A_1 + A_2$
C. $A_1 + 2A_2$
D. $A_1 - 2A_2$
E. $2A_1 + A_2$
2. $\int_2^5 \frac{x^2 + 1}{x^3 + 3x} dx =$

- A. $\frac{1}{3} \ln 10$
B. $\ln 10$
C. $3 \ln 10$
D. $\frac{1}{3} \ln 126$
E. $\ln 126$

3. $\int_0^{5\pi/6} 3x \cos x dx =$

A. $\frac{5\pi}{4} - 3 + \frac{3\sqrt{3}}{2}$

B. $\frac{5\pi}{4} - 3 - \frac{3\sqrt{3}}{2}$

C. $\frac{5\pi}{4} + 3 - \frac{3\sqrt{3}}{2}$

D. $-\frac{5\pi}{4} - 3 - \frac{3\sqrt{3}}{2}$

E. $-\frac{5\pi}{4} - 3 + \frac{3\sqrt{3}}{2}$

4. $\int (x^3 + 8)e^{2x} dx =$

A. $\frac{1}{2}(x^3 + 8)e^{2x} + \frac{3}{4}x^2e^{2x} + \frac{3}{4}xe^{2x} + \frac{3}{8}e^{2x} + C$

B. $\frac{1}{2}(x^3 + 8)e^{2x} - \frac{3}{4}x^2e^{2x} + \frac{3}{4}xe^{2x} - \frac{3}{8}e^{2x} + C$

C. $2(x^3 + 8)e^{2x} - 12x^2e^{2x} + 48xe^{2x} - 96e^{2x} + C$

D. $(x^3 + 8)e^{2x} - 3x^2e^{2x} + 6xe^{2x} - 6e^{2x} + C$

E. $(x^3 + 8)e^{2x} + 3x^2e^{2x} + 6xe^{2x} + 6e^{2x} + C$

5. $\int_1^3 (x+1)^2 \ln(x) dx =$

- A. $12 \ln 3 - \frac{109}{9}$
- B. $15 \ln 3 - \frac{80}{9}$
- C. $15 \ln 3 - \frac{109}{9}$
- D. $21 \ln 3 - \frac{80}{9}$
- E. $21 \ln 3 - \frac{109}{9}$

6. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\cos \theta}{\sqrt{1 + \sin \theta}} d\theta$.

- A. $-2(\sqrt{2} - 1)$
- B. $-2\sqrt{2}$
- C. $2\sqrt{2}$
- D. $2(\sqrt{2} - 1)$
- E. $2(\sqrt{2} + 1)$

7. A typist's speed over a four minute interval is given by $W(t) = \frac{20e^t}{t+1}, 0 \leq t \leq 4$. Use the Trapezoid Rule and $n = 2$ to approximate the number of words typed during the third minute (from $t = 2$ to $t = 3$). Round your answer to the nearest integer.

- A. 55 words
- B. 72 words
- C. 85 words
- D. 97 words
- E. 110 words

8. Find the volume of the solid generated by revolving the region under the graph of $y = \frac{7}{\sqrt{x+2}}$ from $x = 1$ to $x = 5$ about the x -axis.

- A. $\int_1^5 \frac{7\pi}{\sqrt{x+2}} dx$
- B. $\int_1^5 \frac{7\pi}{x+2} dx$
- C. $\int_1^5 \frac{49\pi^2}{x+2} dx$
- D. $\int_1^5 \frac{49\pi}{\sqrt{x+2}} dx$
- E. $\int_1^5 \frac{49\pi}{x+2} dx$

9. Find the volume of the solid whose cross sections are semicircles with diameter $4x$ from $x = 0$ to $x = 3$.
- A. 72π
 - B. 144π
 - C. 12π
 - D. 36π
 - E. 18π

10. $\int_1^{\infty} \frac{4}{(2+t)^2} dt =$

- A. The integral diverges.
- B. 4
- C. -4
- D. $\frac{4}{3}$
- E. $-\frac{4}{3}$

11. Suppose a nuclear accident causes plutonium to be released into the atmosphere. The amount of plutonium that has been released at time a is given by $\int_0^a 3e^{-2t} dt$. What is the total amount of energy that will be given off over all time?

- A. $\frac{3}{2}(1 - e^{-2a})$
- B. ∞
- C. $\frac{3}{2}$
- D. 3
- E. 6

12. For $f(x, y) = \frac{(x + \frac{1}{4}) \tan y}{y}$, find $f(\frac{3}{4}, \frac{\pi}{6})$.

- A. $\frac{\sqrt{3}\pi}{3}$
- B. $\frac{6\sqrt{3}}{\pi}$
- C. $\frac{\sqrt{3}\pi}{6}$
- D. $\frac{2\sqrt{3}}{\pi}$
- E. $\frac{\sqrt{3}\pi}{18}$