

5.4-5.5 Chapter 5

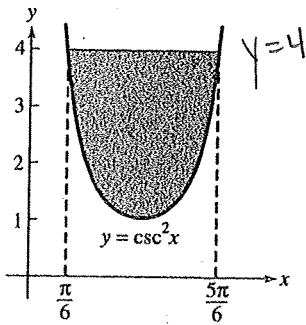
1. Evaluate $\int_1^6 \frac{4}{x^3} dx$ using Part 2 of the Fundamental Theorem.

- (A) $-\frac{35}{18}$
- (B) $-\frac{35}{36}$
- (C) $\frac{35}{18}$
- (D) $\frac{35}{36}$
- (E) $\frac{1295}{108}$

$$\int_1^6 4x^{-3} dx = \frac{4x^{-2}}{-2} = -\frac{2}{x^2} \Big|_1^6 = -\frac{2}{36} + \frac{2}{1} = -\frac{1}{18} + \frac{36}{18} = \frac{35}{18}$$

1. _____ C

2. Find the area of the shaded region.



- (A) $\frac{8\pi}{3}$
- (B) $\frac{8\pi}{3} + \frac{2}{\sqrt{3}}$
- (C) $\frac{8\pi}{3} - 2\sqrt{3}$
- (D) $\frac{8\pi}{3} + 2\sqrt{3}$
- (E) $2\sqrt{3}$

$$\int_{\pi/6}^{5\pi/6} 4 dx - \int_{\pi/6}^{5\pi/6} \csc^2 x dx = 4x \Big|_{\pi/6}^{5\pi/6} + \cot x \Big|_{\pi/6}^{5\pi/6} = \frac{20\pi}{6} - \frac{4\pi}{6} + \cot \frac{5\pi}{6} - \cot \frac{\pi}{6} = \frac{16\pi}{6} + \sqrt{3} - \sqrt{3} = \frac{8\pi}{3}$$

2. _____ C

3. Use NINT to find the approximate value of

$$\int_{0.1}^{0.5} \frac{\cos^3 x}{1+x^2} dx.$$

- (A) 0.27
- (B) 0.28
- (C) 0.31
- (D) 0.36
- (E) 0.41

$$\text{Nint}(\cos(x) \wedge 3 / (1+x^2), x_1, 0.1, 0.5) = .31436$$

3. _____ C

4. Find $\frac{dy}{dx}$ if $y = \int_0^{-x} (5t^2 - 6t - 1) dt$.

- (A) $-10x - 6$
- (B) $-5x^2 - 6x + 1$
- (C) $5x^2 + 6x - 1$
- (D) $-5x^2 + 6x + 1$
- (E) $5x^2 - 6x - 1$

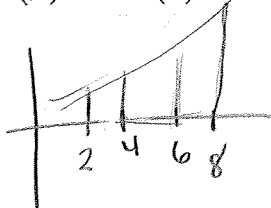
* chain rule w/ $-1x!$

$$(5(-x)^2 - 6(-x) - 1) \cdot -1 = -5x^2 - 6x + 1$$

4. _____ B

5. Use the Trapezoidal Rule with $n = 3$ to approximate the value of $\int_2^8 2x^3 dx$.

- (A) 1152 (B) 1980 (C) 2070 (D) 2160 (E) 3168



$$\begin{aligned} \text{height} &= \frac{8-2}{3} = \frac{6}{3} = 2 \\ &= \frac{2}{2} (16 + 2 \cdot 128 + 2 \cdot 432 + 1024) = \\ &= \boxed{2160} \end{aligned}$$

D

C

Skip

6. Use Simpson's Rule with $n = 4$ to approximate the value of $\int_{-2}^2 (3x - 5)^3 dx$.

- (A) -1830 (B) -1310 (C) -1220
(D) -1175 (E) -957

6. _____

Skip

7. Which of the following methods will typically give the most accurate approximation of the value of a definite integral? (Assume the same number of intervals are used for each method.)

- (A) Simpson's Rule (B) Midpoint rectangles
(C) Left-endpoint rectangles (D) Trapezoidal Rule
(E) Right-endpoint rectangles

A

7. _____