

The Definite Integral

1. If $\int_2^8 f(x)dx = -10$ and $\int_2^4 f(x)dx = 6$, then $\int_8^4 f(x)dx =$
(A) -16 (B) -6 (C) -4 (D) 4 (E) 16
2. If the definite integral $\int_a^b f(x)dx$ represents the area of the region bounded by $y = f(x)$, the x -axis, and the lines $x = a$ and $x = b$, which of the following must be true?
(A) $a > b$ and $f(x) > 0$ (B) $a > b$ and $f(x) < 0$ (C) $a < b$ and $f(x) > 0$
(D) $a < b$ and $f(x) < 0$ (E) None of the above
3. If $\int_0^4 (x^2 - 6x + 9) dx$ is approximated by 4 inscribed rectangles of equal width on the x -axis, then the approximation is
(A) 14 (B) 10 (C) 6 (D) 5 (E) 4
4. If $f'(x) = 3x^2$ and $f(-1) = 2$, then $\int_0^2 f(x)dx =$
(A) $\frac{8}{3}$ (B) 4 (C) 7 (D) 10 (E) 28
5. Suppose that $f(x)$ is an even function and let $\int_0^1 f(x)dx = 5$ and $\int_0^7 f(x)dx = 1$. What is $\int_{-7}^{-1} f(x)dx$?
(A) -5 (B) -4 (C) 0 (D) 4 (E) 5
6. The area of the region between the graph of $y = 3x^2 + 2x$ and the x -axis from $x = 1$ to $x = 3$ is
(A) 36 (B) 34 (C) 31 (D) 26 (E) 12
7. If $\int_1^7 \ln x dx$ is approximated by 3 circumscribed rectangles of equal width on the x -axis, then the approximation is
(A) $\frac{1}{2}(\ln 3 + \ln 5 + \ln 7)$ (B) $\frac{1}{2}(\ln 1 + \ln 3 + \ln 5)$ (C) $2(\ln 3 + \ln 5 + \ln 7)$
(D) $2(\ln 3 + \ln 5)$ (E) $\ln 1 + 2\ln 3 + 2\ln 5 + \ln 7$

Review:

8. $\int_0^2 (2x^3 + 3) dx =$

(A) 8

(B) 11

(C) 14

(D) 20

(E) 24

9. If the substitution $u = \sqrt{x-1}$ is made, the integral $\int_2^5 \frac{\sqrt{x-1}}{x} dx =$

(A) $\int_2^5 \frac{2u^2}{u^2+1} du$

(B) $\int_1^2 \frac{u^2}{u^2+1} du$

(C) $\int_1^2 \frac{u^2}{2(u^2+1)} du$

(D) $\int_2^5 \frac{u}{u^2+1} du$

(E) $\int_1^2 \frac{2u^2}{u^2+1} du$

10. If $\int_0^2 (2x^3 - kx^2 + 2k) dx = 12$, then k must be

(A) 1

(B) 2

(C) 3

(D) -2

(E) -3