

Student: Cole Lamers
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Instructor: Viktoriya Shcherban
Course: Calc 1 11:30 AM / Internet
 (81749&81750) Shcherban

Assignment: 5.3 The Definite Integral
 (Set 1)

1. Express the limit $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n c_k^6 \Delta x_k$, P a partition of $[4, 6]$, as a definite integral.

The $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n c_k^6 \Delta x_k$, with P a partition of $[4, 6]$, expressed as a definite integral, is $\int_4^6 x^6 dx$.

2. Express the limit $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n (c_k^9 - 4c_k) \Delta x_k$, P a partition of $[-2, 11]$, as a definite integral.

The limit expressed as a definite integral is $\int_{-2}^{11} (x^9 - 4x) dx$.

3. Express the limit $\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n (\cot c_k) \Delta x_k$ as a definite integral where P is a partition of $\left[\frac{\pi}{3}, \frac{2\pi}{3}\right]$.

The limit expressed as a definite integral, is $\int_{\frac{\pi}{3}}^{\frac{2\pi}{3}} (\cot x) dx$.

(Type an exact answer, using π as needed.)

4.

The functions f and g are integrable and $\int_2^4 f(x)dx = -6$, $\int_2^7 f(x)dx = 6$, and $\int_2^7 g(x)dx = 4$. Use these to complete parts (a) through (f).

a. $\int_4^4 f(x)dx =$

(Simplify your answer.)

b. $\int_7^2 g(x)dx =$

(Simplify your answer.)

c. $\int_2^7 2g(x)dx =$

(Simplify your answer.)

d. $\int_4^7 f(x)dx =$

(Simplify your answer.)

e. $\int_2^7 [g(x) - f(x)]dx =$

(Simplify your answer.)

f. $\int_2^7 [8g(x) - f(x)]dx =$

(Simplify your answer.)

5. Suppose that $\int_2^3 f(x)dx = 8$. Find the value of the following definite integrals. Complete parts (a) through (d).

(a) $\int_2^3 f(u)du =$ (Type an exact answer, using radicals as needed.)

(b) $\int_2^3 \sqrt{2} f(z)dz =$ (Type an exact answer, using radicals as needed.)

(c) $\int_3^2 f(t)dt =$ (Type an exact answer, using radicals as needed.)

(d) $\int_2^3 [-f(x)]dx =$ (Type an exact answer, using radicals as needed.)

6. Suppose that f is integrable, and that $\int_0^4 f(z)dz = 5$ and $\int_0^5 f(z)dz = 9$. Find the value of the following definite integrals.

(a) $\int_4^5 f(z)dz =$ (Type an integer or a decimal.)

(b) $\int_5^4 f(z)dz =$ (Type an integer or a decimal.)

7. Graph the integrand, and use area to evaluate the definite integral $\int_{-2}^4 \left(\frac{x}{2} + 4 \right) dx$.

The value of the definite integral $\int_{-2}^4 \left(\frac{x}{2} + 4 \right) dx$ as determined by the area under the graph of the integrand is

.

(Simplify your answer.)

8. Use area to evaluate the integral $\int_0^b \frac{10x}{11} dx$, $b > 0$.

$\int_0^b \frac{10x}{11} dx =$

9. Use areas to evaluate the integral.

$$\int_a^{12b} 2s \, ds, \quad 0 < a < b$$

$$\int_a^{12b} 2s \, ds = \boxed{144b^2 - a^2}$$

10. Evaluate the integral $\int_3^{\sqrt{10}} x \, dx$.

The value of the integral $\int_3^{\sqrt{10}} x \, dx$ is $\boxed{\frac{1}{2}}$.
(Type an integer or a simplified fraction.)

11. Evaluate the integral $\int_{5\pi}^{6\pi} \theta \, d\theta$.

$$\int_{5\pi}^{6\pi} \theta \, d\theta = \boxed{\frac{11\pi^2}{2}} \quad (\text{Type an exact answer, using } \pi \text{ as needed.})$$
