

Worksheet: Properties of Definite Integrals



Q1: Suppose f has absolute minimum value m and absolute maximum value M . Given that $a \leq x \leq b$, which property of integrals allows you to decide between what two values $\int_a^b f(x) dx$ must lie?

A $(b - a) \leq \int_a^b f(x) dx \leq M(b - a)$

B $m(b - a) \leq \int_a^b f(x) dx \leq (b - a)$

C $a \leq \int_a^b f(x) dx \leq b$

D $m \leq \int_a^b f(x) dx \leq M$

E $m(b - a) \leq \int_a^b f(x) dx \leq M(b - a)$

Q2: Write $\int_{-2}^3 f(x) dx + \int_3^4 f(x) dx - \int_{-2}^0 f(x) dx$ in the form $\int_a^b f(x) dx$.

A $\int_0^3 f(x) dx$

B $\int_3^{-2} f(x) dx$

C $\int_4^0 f(x) dx$

D $\int_0^4 f(x) dx$

E $\int_3^0 f(x) dx$

Q3: If $\int_{-7}^8 g(x) dx = 10$, determine the value of $\int_8^{-7} 7g(x) dx$.

A 70

B $\frac{7}{10}$

C 17

D -70

E 10



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Q4: If $\int_{-2}^6 f(x) dx = 1$ and $\int_{-2}^9 f(x) dx = 11$, find $\int_6^9 f(x) dx$.

A 10

B -12

C -10

D 12

Q5: If $\int_{-5}^2 f(x) dx = -2.4$ and $\int_{-5}^{-1} f(x) dx = -1.4$, find $\int_{-1}^2 f(x) dx$.

A -1.4

B -1

C 1

D -3.8

E -2.4

Q6: The function f is continuous on \mathbb{R} . Given $\int_{-2}^1 f(x) dx = 95$ and

$\int_8^1 f(x) dx = 7$, what is $\int_{-2}^8 f(x) dx$?

A -88

B -102

C 102

D 88

Q7: The function f is continuous on \mathbb{R} . Given $\int_{-8}^{-4} f(x) dx = 80$ and

$\int_7^{-4} f(x) dx = 3$, what is $\int_{-8}^7 f(x) dx$?

A -77

B -83

C 83

D 77

Q8: The function f is continuous on \mathbb{R} . Given $\int_{-7}^{-5} f(x) dx = 66$ and

$\int_2^{-5} f(x) dx = -27$, what is $\int_{-7}^2 f(x) dx$?

A -93

B -39

C 39

D 93

Q9: The function f is continuous on \mathbb{R} . Given $\int_{-6}^4 f(x) dx = 18$ and

$\int_{-1}^{-6} f(x) dx = 6$, what is $\int_{-1}^4 f(x) dx$?

A -24

B 24

C 12

D -12

Q10: The function f is continuous on \mathbb{R} . Given $\int_1^7 f(x) dx = 86$ and $\int_5^1 f(x) dx = 37$, what is $\int_5^7 f(x) dx$?

A -123

B 123

C 49

D -49

Q11: The function f is continuous on \mathbb{R} . Given $\int_{-9}^{-3} f(x) dx = 91$ and $\int_{-8}^{-9} f(x) dx = -23$, what is $\int_{-8}^{-3} f(x) dx$?

A -68

B 68

C 114

D -114

Q12: The function f is continuous on $[-4, 4]$ and satisfies $\int_0^4 f(x) dx = 9$.

Determine $\int_0^4 [f(x) - 6] dx$.

A -6

B 3

C -15

D 33

Q13: If $\int_{-9}^1 f(x) dx = 7$ and $\int_{-9}^1 g(x) dx = -7$, determine the value of

$\int_{-9}^1 [f(x) + g(x)] dx$.

A -49

B 14

C -14

D -1

E 0

Q14: If $\int_{-4}^5 f(x) dx = 82$ and $\int_{-4}^5 g(x) dx = 74$, find $\int_{-4}^5 [2f(x) - 4g(x)] dx$.

A 460

B -296

C 164

D -132

E 132

Q15: Suppose that on $[-2, 5]$, the values of f lie in the interval $[m, M]$.

Between which bounds does $\int_{-2}^5 f(x) dx$ lie?

A $7m \leq \int_{-2}^5 f(x) dx \leq 7$

B $m \leq \int_{-2}^5 f(x) dx \leq M$

C $-2 \leq \int_{-2}^5 f(x) dx \leq 5$

D $7 \leq \int_{-2}^5 f(x) dx \leq 7M$

E $7m \leq \int_{-2}^5 f(x) dx \leq 7M$

Q16: The function f is odd, continuous on $[-1, 7]$, and satisfies $\int_1^7 f(x) dx =$

-17. Determine $\int_{-1}^7 f(x) dx$.

A 17

B -34

C -17

D 0

Q17: The function f is even, continuous on $[-8, 8]$, and satisfies $\int_{-8}^8 f(x) dx = 19$ and $\int_0^4 f(x) dx = 13$. Determine $\int_{-8}^{-4} f(x) dx$.

A $-\frac{21}{2}$

B $\frac{45}{2}$

C $-\frac{7}{2}$

D -32

Q18: If the even function f is continuous over the interval $[-4, 4]$, where

$$\int_0^4 f(x) dx = 2, \text{ determine the value of } \int_{-4}^4 f(x) dx.$$

A 4

B 0

C 2

D -4

E 8

Q19: Determine $\int_{-2}^2 7x^3 \sqrt{5x^2 + 5} dx$.

A 0

B $-\frac{700}{3}$

C $\frac{140}{3}$

D $\frac{700}{3}$

E $\frac{287}{5}$

Q20: Determine $\int_{-1}^1 \frac{9x^3 - 6x}{2x^2 + 9} dx$.

A 0

B $-\frac{6}{11}$

C $-\frac{3}{11}$

D $-\frac{3}{22}$

Q21: Evaluate $\int_{-1}^1 x^{88} dx$.

A 0

B $\frac{1}{44}$

C $\frac{1}{89}$

D $\frac{2}{89}$

E $\frac{1}{88}$



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Q22: Find $\int_{-5}^{-4} k \, dx + \int_8^{-5} k \, dx$, given that K is a constant.

A $-12k$

B -24

C $-6k$

D $14k$