

What is the formula for the average value of $f(x)$ on $[a, b]$?

$$\text{Average Value of } f(x) \text{ on } [a, b] \\ = \frac{1}{b-a} \int_a^b f(x) dx$$

Find the average value of $f(x) = 2x - 3x^2$ on $[1, 4]$.

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$$\frac{1}{4-1} \int_1^4 2x - 3x^2$$

$$\frac{1}{3} \left[\frac{2x^2}{2} - \frac{3x^3}{3} \right]_1^4$$

$$\frac{1}{3} [x^2 - x^3]_1^4$$

$$\frac{1}{3} [(16 - 64) - (1 - 1)]$$

$$\frac{1}{3} [-48 - 0]$$

$$-16$$

Find the units for each:

A. $\int_a^b \frac{\text{feet}}{\text{min}} dt =$

B. $\frac{1}{b-a} \int_a^b \frac{\text{feet}}{\text{min}} dt =$

C. $\int_a^b \frac{\text{cars}}{\text{hour}} dt =$

D. $\frac{1}{b-a} \int_a^b \frac{\text{cars}}{\text{hour}} dt =$

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C. $\int_a^b \frac{\text{cars}}{\text{hour}} dt = \text{cars}$

D. $\frac{1}{b-a} \int_a^b \frac{\text{cars}}{\text{hour}} dt = \frac{\text{cars}}{\text{hour}}$