

Average Value of a Function

p. 467 - 469 (6.4)

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If f is integrable on $[a, b]$, its **average (mean) value** on $[a, b]$ is

$$\frac{1}{b-a} \int_a^b (f(x)) dx.$$

a)
$$\frac{\int_a^b (f(x)) dx}{b-a} = \frac{\text{area}}{\text{width}} f(c) = \text{average height}$$

b) Finding "c" is where the average height occurs

c) Average value = average velocity

**1. Find the average value of $y = x^2\sqrt{x^3 + 1}$ on the interval $[0, 2]$.

2. Find the average value of $f(x) = \sin(x)$ over $[0, \pi]$.

**calc.(FR) 3. A function f , $f(t) = 6 + \cos\left(\frac{t}{10}\right) + 3 \sin\left(\frac{7t}{40}\right)$, is used

to model the velocity of a plane in miles per minute. According to this model, what is the average velocity of the plane for $0 \leq t \leq 40$?