

Advanced Challenge Level 2 Problem #17

The average value, V , of a function $y = f(x)$ over the interval $[a, b]$ can be found using the formula below.

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

Consider the following functions along with the given intervals. For each problem, you must

- Graph the function over the specified interval, $[a, b]$.
- Use the above formula to find the average value of the function over $[a, b]$.
- Draw the horizontal line, $y = V$, corresponding to the average value.

Note: Make a separate graph for each problem.

- $f(x) = x - 1 ; [2 , 7]$
- $f(x) = 2x + 1 ; [0 , 4]$
- $f(x) = -2x + 3 ; [-3 , 1]$
- $f(x) = x^2 - 1 ; [1 , 3]$
- $f(x) = \sqrt{x} ; [0 , 16]$