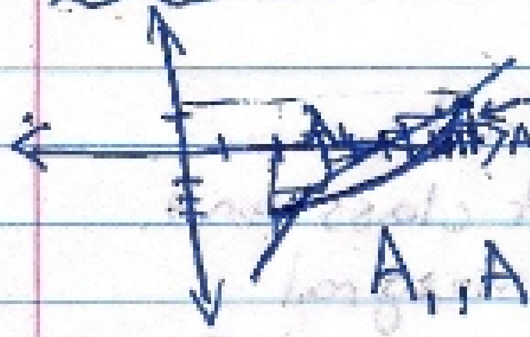
~~an appropriately chosen function.~~

Solution: 1.) Graph $f(x) = \frac{1}{2}x - 4$ on $[2, 10]$

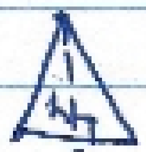


$f(2) = \frac{1}{2}(2) - 4$ (-3) (will get

$f(10) = \frac{1}{2}(10) - 4$ (1) straight line)

$f(x) = 0$, $\frac{1}{2}x - 4 = 0$, $+4 \; +4$, $x/2 = 4, x = 8$

A_1, A_2 = the area of triangles



$A_\Delta = \frac{1}{2} \cdot c \cdot h$

2.) Then what is $\int_2^{10} (\frac{1}{2}x - 4)\,dx = \{A_1 - A_2\} = 1 - 9 = -8$

3.) Find A_1 & A_2

$A_1 = \frac{1}{2} \cdot 2 \cdot 1 = 1$ units^2

$A_2 = \frac{1}{2} \cdot 6 \cdot 3 = 9$ units^2

Algebraic Properties of definate integrals

Let f & g be integrable functions on $[a,b]$

1.) $\int_a^a f(x)\,dx = 0$ because $\int_a^a f(x)\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} \rightarrow$ $f(x_i^*)\,\Delta x \left(\frac{a-a}{n}\right) = 0$

2.) $\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$ because $\int_a^b f(x)\,dx =$ $\lim_{n\to\infty} \sum_{i=1}^{n} f(x_i^*)\,\Delta x \left(\frac{b-a}{n} = \frac{-(a-b)}{n}\right) = -\lim_{n\to\infty} \sum_{i=1}^{n} f(x_i^*)$ $\frac{a-b}{n} = -\int_b^a f(x)\,dx$

~~3.~~

3.) $\int_a^b k \cdot f(x)\,dx = k \cdot \int_a^b f(x)\,dx$

(k is constant, $\neq 0$)

4.) $\int_a^b (f(x) + g(x))\,dx = \int_a^b f(x)\,dx + \int_a^b g(x)\,dx$

5.) Suppose f is integrable over the interval containing points a, b, & c,

$\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$

$\int_a^c f(x)\,dx = \int_a^b f(x)\,dx + \int_b^c F(x)$