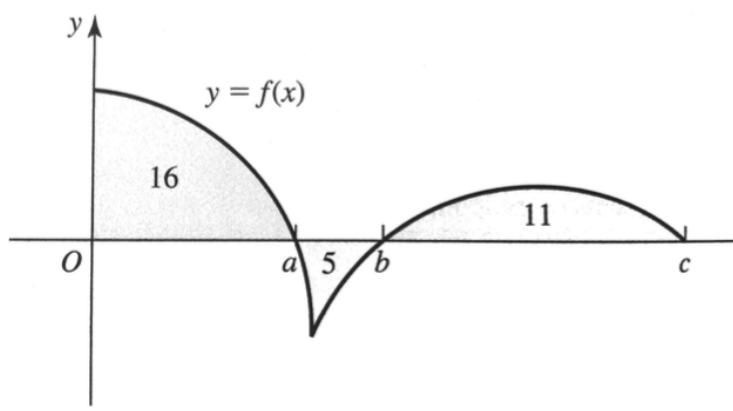# §5.2: The Definite Integral

1.] Consider the following function below with the areas of each region given.
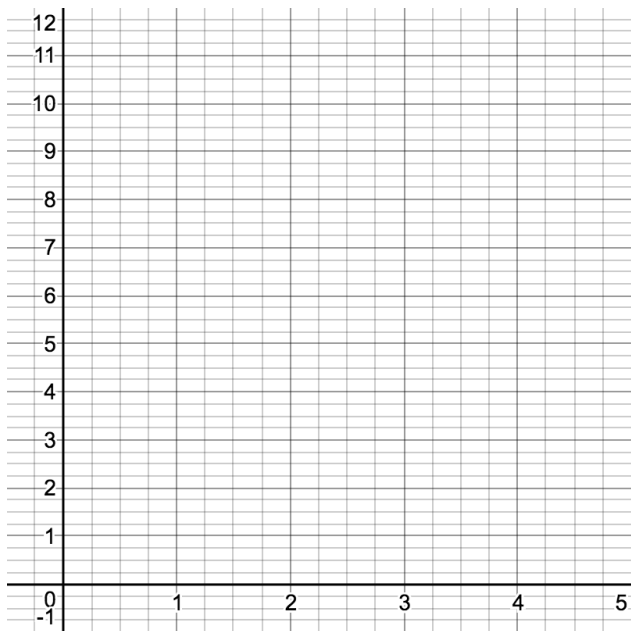

a.) $\displaystyle\int_0^a f(x)\,dx$

b.) $\displaystyle\int_0^b f(x)\,dx$

c.) $\displaystyle\int_a^c f(x)\,dx$

d.) $\displaystyle\int_0^c f(x)\,dx$

2.] Compute $\displaystyle\int_2^4 (2x+3)\,dx$ using a geometric argument.

3.] Suppose we only know the fact that $\displaystyle\int_0^4 3x(4-x)\,dx = 12$. Use properties of the definite integral to compute the following, if possible:

a.) $\displaystyle\int_4^0 3x(4-x)\,dx$

b.) $\displaystyle\int_0^4 6x(4-x)\,dx$

c.) $\displaystyle\int_0^4 x(x-4)\,dx$

d.) $\displaystyle\int_0^8 3x(4-x)\,dx$

4.] Suppose we only know the fact that $\displaystyle\int_1^4 f(x)\,dx = 8$ and $\displaystyle\int_1^6 f(x)\,dx = 5$. Use properties of the definite integral to compute the following, if possible:

a.) $\displaystyle\int_4^6 f(x)\,dx$

b.) $\displaystyle\int_1^6 f(x)^2\,dx$

c.) $\displaystyle\int_1^1 f(x)^2\,dx$

d.) $\displaystyle\int_1^4 3f(x) - 2\,dx$

5.] Find the average value of $f(x) = x^2$ over the interval $[0, 9]$.