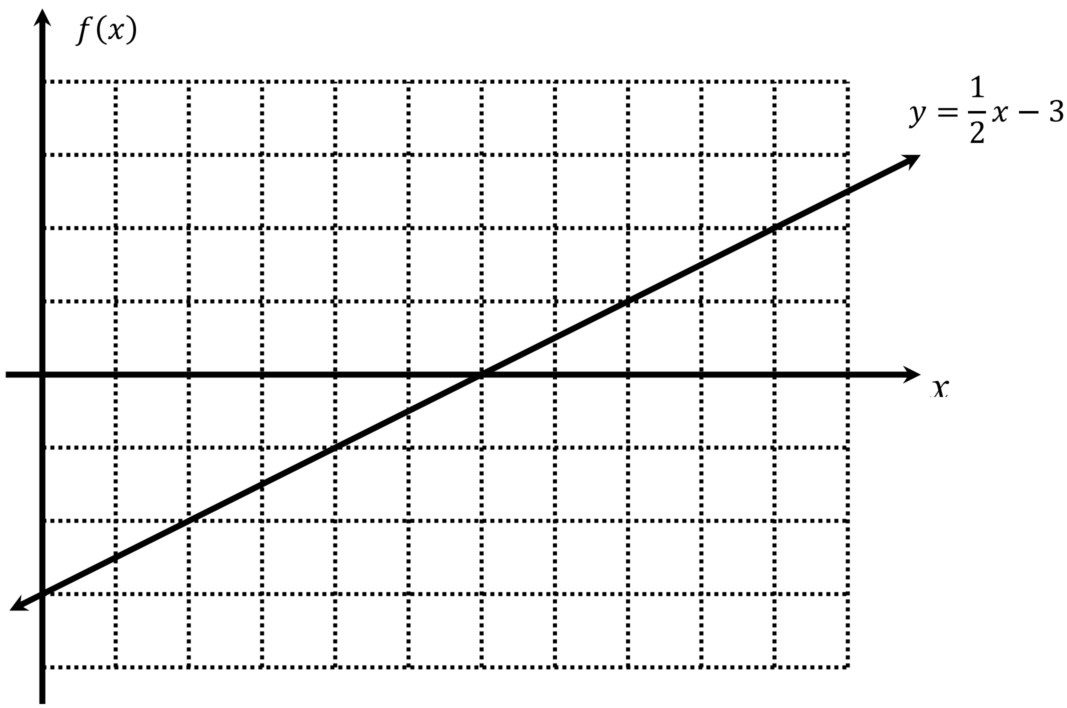
Class Drill: Finding Unsigned and Signed Areas Using Geometry (Section 5.4)



The graph of $f(x) = \frac{1}{2}x - 3$ is shown above.

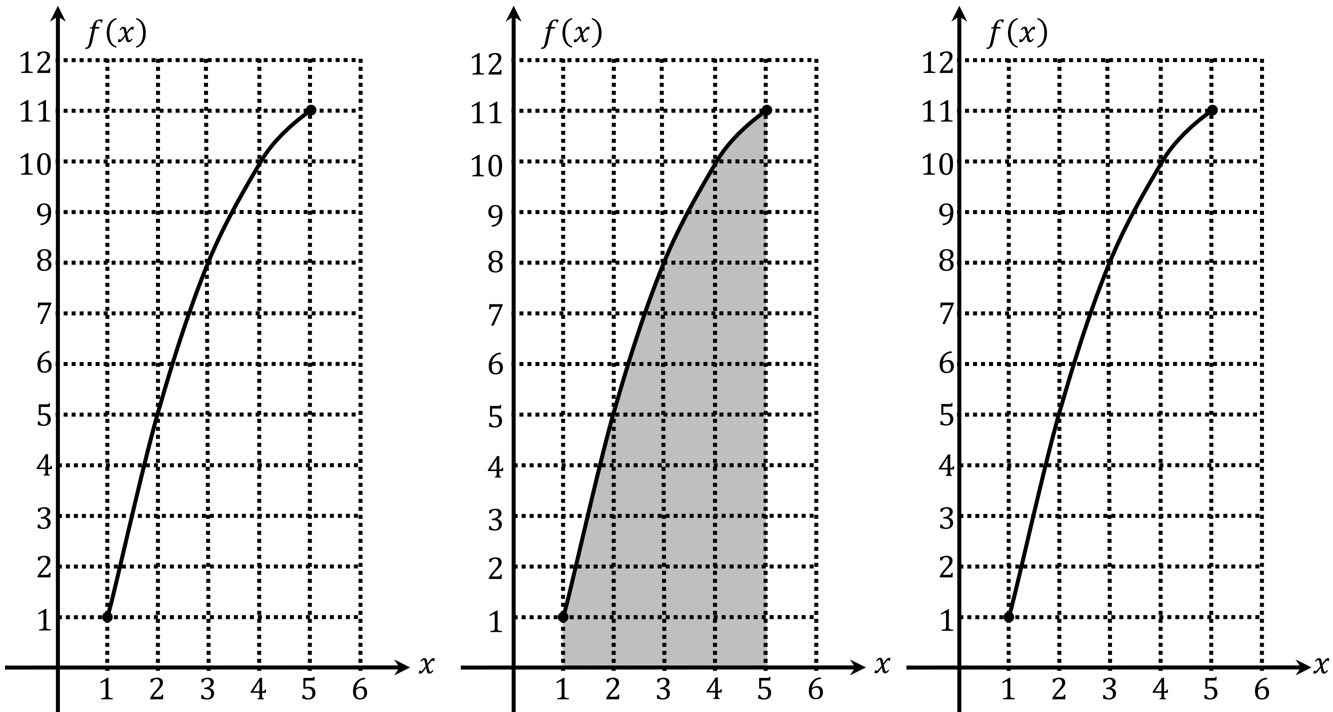
(A) Shade the region between the graph of $f(x)$ and the x axis from $x = 4$ to $x = 10$.

(B) Find the ***unsigned area*** of the region. (Hint: Use formulas from geometry.)

(C) Find the ***signed area*** of the region.

Class Drill: Estimating the Area Under a Graph Using Riemann Sums (Section 5.4, H76)

The goal is to estimate the area between the graph of $f(x)$ and the x axis on the interval [1,5]. The region is shaded in the middle figure. You will do this by finding the values of the Riemann sums L_4 and R_4. This will give you lower and upper bounds for the unknown shaded area.



L_4 unknown shaded area R_4

(A) On the left graph, draw and shade the four "left rectangles" for the left sum L_4. (They should be sitting on the interval [1,5].)

(B) Find the value of L_4.

(C) On the right graph, draw and shade the four "right rectangles" for the right sum R_4. (They should be sitting on the interval [1,5].)

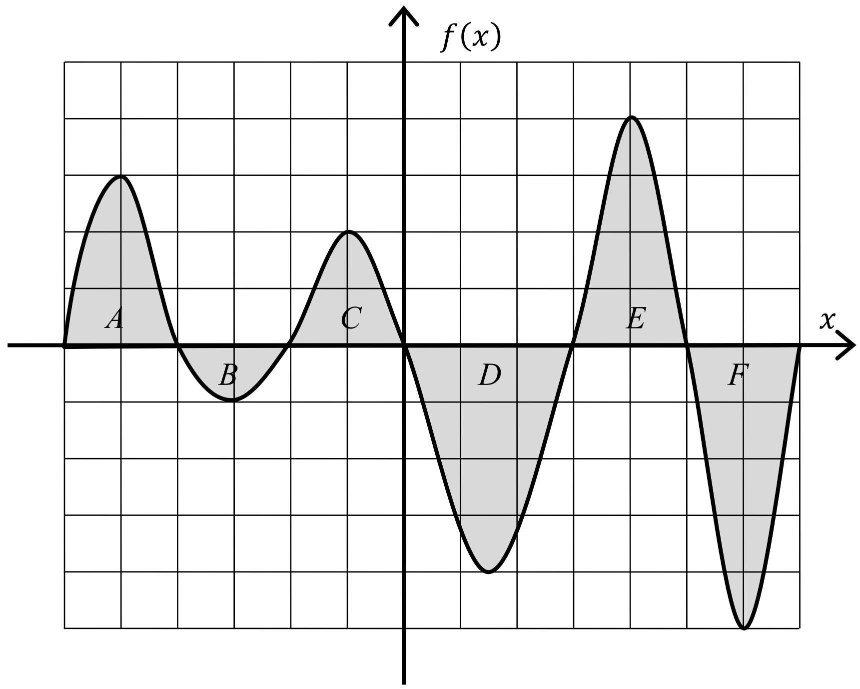
(D) Find the value of R_4.

(E) Use the values from questions (B) and (D) to build a true inequality below:

_________ < unknown shaded area < _________

Class Drill: Using Properties of the Definite Integral (Section 5.4, Homework H77)

The graph of $f(x)$ is shown at right.



The areas of the six shaded regions are:

The area of region A is 4.

The area of region B is 2.

The area of region C is 3.

The area of region D is 7.

The area of region E is 5.

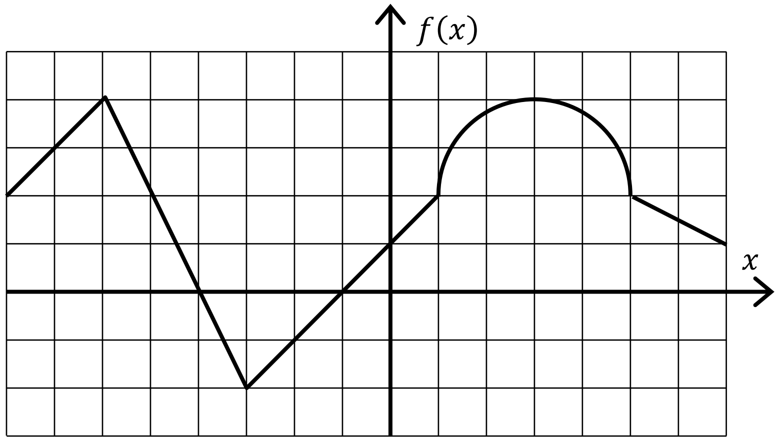
The area of region F is 6.

Find the value of the definite integrals.

$$\int_{x=-2}^{x=5} f(x)dx =$$

$$\int_{x=-6}^{x=3} f(x)dx =$$

Class Drill: Definite Integrals for a Simple Graph (Section 5.4)



Recall that the the *definite integral*

$$SA = \int_{x=a}^{x=b} f(x)dx$$

is also called the *signed area* between the graph of $f(x)$ and the x-axis, from $x = a$ to $x = b$.
For the given graph of $f(x)$, find value of these definite integrals:

(A) $\displaystyle\int_{x=-6}^{x=1} f(x)dx$

(B) $\displaystyle\int_{x=-5}^{x=1} f(x)dx$

(C) $\displaystyle\int_{x=-4}^{x=1} f(x)dx$

(D) $\displaystyle\int_{x=-5}^{x=5} f(x)dx$

(E) $\displaystyle\int_{x=5}^{x=5} f(x)dx$

(F) $\displaystyle\int_{x=5}^{x=1} f(x)dx$