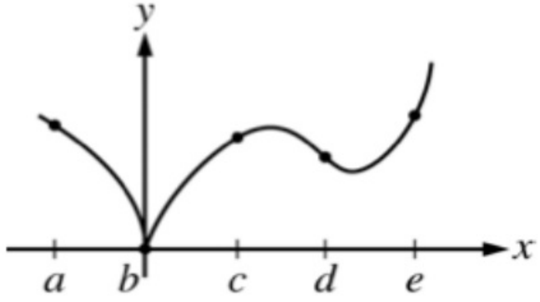
No Calculator for either question!!!!



Graph of f

. The graph of the function f is shown in the figure above. For which of the following values of x is $f'(x)$ positive and increasing?

(A) a (B) b (C) c (D) d (E) e

$$f(x) = \begin{cases} \dfrac{(2x+1)(x-2)}{x-2} & \text{for } x \neq 2 \\ k & \text{for } x = 2 \end{cases}$$

Let f be the function defined above. For what value of k is f continuous at $x = 2$?

(A) 0 (B) 1 (C) 2 (D) 3 (E) 5

Definite Integrals

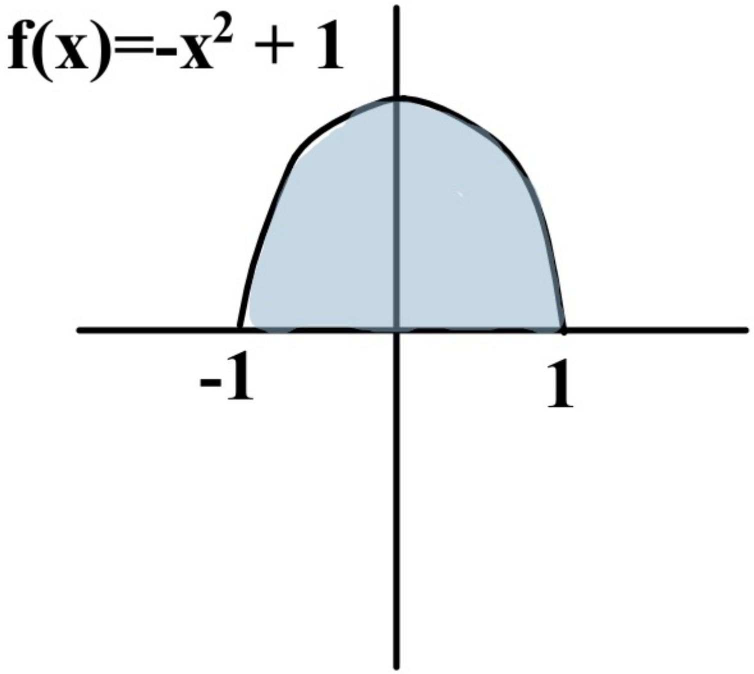
$$\lim_{\Delta x \to 0} \sum_{i=1}^{n} f(x_i)\Delta x = \int_a^b f(x)dx$$

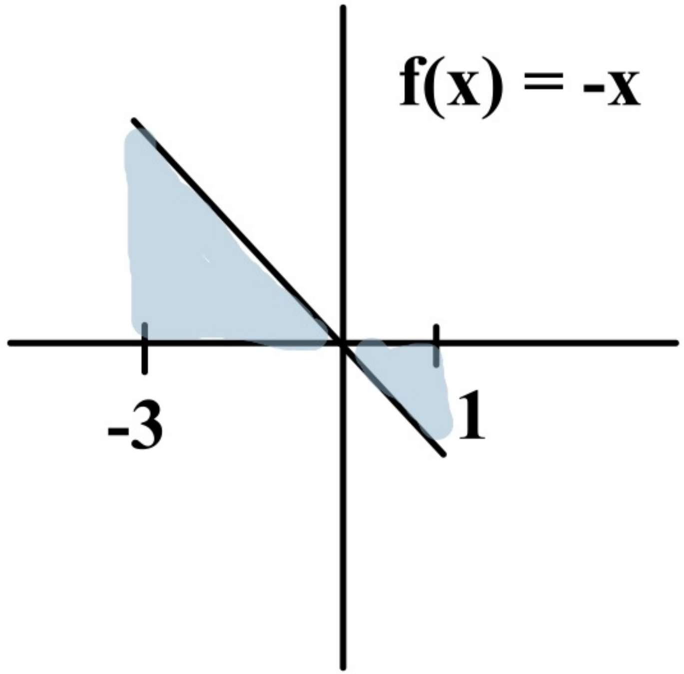
Note: A definite integral is a value that represents the value of the sum of the shaded regions above or below a curve. It is not the area unless all shaded portions are above the x-axis.

Examples

Definite Integrals

Set up a definite integral for its diagram.





Does it represent the area of the shaded region?

Examples

Evaluating Definite Integrals

Before we learn how to analytically evaluate definite integrals. We will use graphs and simple geometry to evaluate to get a deeper understanding of what it is we are finding.

1 2 3

Evaluating Definite Integrals

$$Find \int_1^4 2\,dx$$

Does this represent the area of the shaded region?

1 2 3

Evaluating Definite Integrals

$$Find \int_{1}^{7} (-2x + 10)dx$$

Is this the area of the shaded region?

1 2 3

Evaluating Definite Integrals

$$Find \int_{-3}^{3} -\sqrt{9 - x^2}\, dx$$

Is this the area of the shaded region?

1 2 3

Properties of Definite Integrals

$$\int_a^a f(x)dx = 0$$

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

$$\int_b^a f(x)dx = -\int_a^b f(x)dx$$

$$\int_a^b kf(x)dx = k\int_a^b f(x)dx$$

$$\int_a^b f(x) \pm g(x)dx = \int_a^b f(x)dx \pm \int_a^b g(x)dx$$

Using the Properties

Answer the questions given the following:

$$\int_1^5 x^2 dx = 4 \qquad \int_1^5 x dx = 2 \qquad \int_1^5 dx = 1$$

a) $\int_5^1 x dx$

b) $\int_3^3 x^2 dx$

c) $\int_1^5 3x^2 dx$

d) $\int_1^5 2x^2 + x + 4 dx$

1 2

Using the Properties

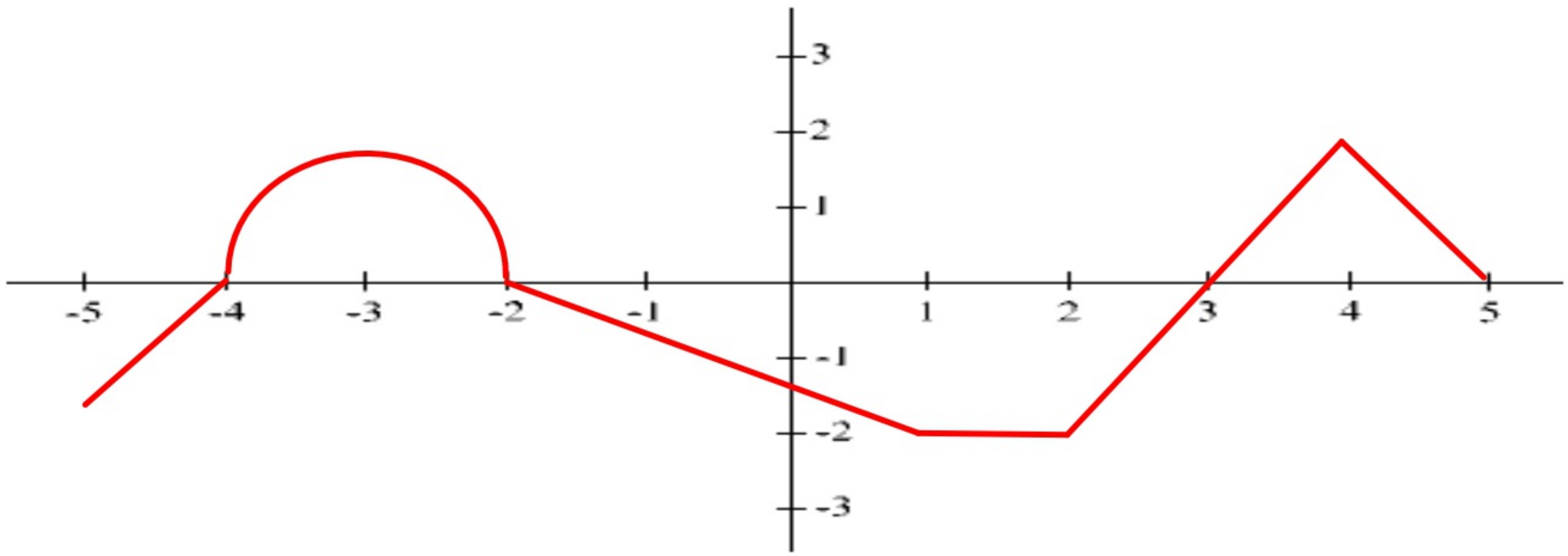
Given $\int_0^3 f(x)dx = 4$ **and** $\int_3^6 f(x)dx = -1$ **find:**

a) $\int_3^6 -5f(x)dx$

b) $\int_6^3 f(x)dx$

c) $\int_0^6 f(x)dx$

1 **2**



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

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

c) **Area from[-5,5]**