the center, the axis of x horizontal and the axis of y positive downward. The element of pressure is

$$2kyx\,dy$$

and the total pressure is

$$P = 2k\int_0^6 yx\,dy.$$

x is expressed in terms of y by means of the equation of the ellipse,

$$\frac{x^2}{64} + \frac{y^2}{36} = 1.$$

Then

$$P = 2k\,\tfrac{4}{3}\int_0^6 y\sqrt{36 - y^2}\,dy.$$

Exercises

1. Find the pressure on the vertical parabolic gate, Fig. 51: (*a*) if the edge AB lies in the surface of the water; (*b*) if the edge AB lies 5 feet below the surface.

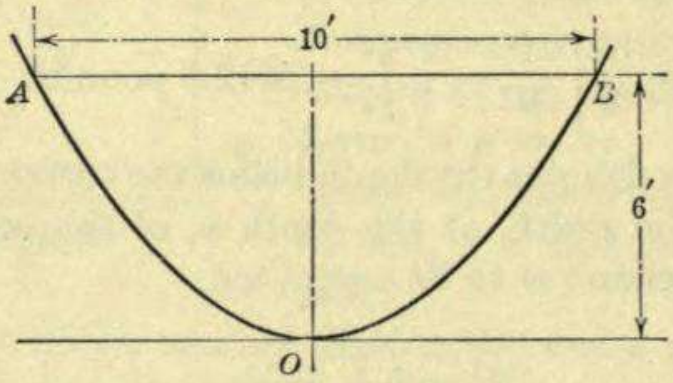

FIG. 51.

2. Find the pressure on a vertical semicircular gate whose diameter, 10 feet long, lies in the surface of the water.

73. Arithmetic Mean. The arithmetic mean, A, of a series of n numbers, $a_1, a_2, a_3, \cdots, a_n$, is defined by the equation

$$nA = a_1 + a_2 + a_3 + \cdots + a_n,$$

or

$$\mathbf{A = \frac{a_1 + a_2 + a_3 + \cdots + a_n}{n}}.$$

That is, A is such a number that if each number in the sum