We want to find how the volume, V, of a balloon changes as it is filled with air. We know $V = 4/3\ \pi r^3$, where r is the radius in inches and V is in cubic inches. The expression $\frac{V(3)-V(1)}{3-1}$ represents

(a) The average rate of change of the radius with respect to the volume when the radius changes from 1 inch to 3 inches.
(b) The average rate of change of the radius with respect to the volume when the volume changes from 1 cubic inch to 3 cubic inches.
(c) The average rate of change of the volume with respect to the radius when the radius changes from 1 inch to 3 inches.
(d) The average rate of change of the volume with respect to the radius when the volume changes from 1 cubic inch to 3 cubic inches.

We want to find how the volume, V, of a balloon changes as it is filled with air. We know $V = 4/3\ \pi r^3$, where r is the radius in inches and V is in cubic inches. Which of the following represents the rate at which the volume is changing when the radius is 1 inch?

(a) $\dfrac{V(1.01)-V(1)}{0.01} = 12.69\ \text{in}^3$

(b) $\dfrac{V(0.99)-V(1)}{-0.01} = 12.44\ \text{in}^3$

(c) $\lim\limits_{h\to 0}\left(\dfrac{V(1+h)-V(1)}{h}\right)\text{in}^3$

(d) All of the above

Which of the following expressions represents the slope of a line drawn between the two points marked in Figure 2.4?

(a) $m = \dfrac{F(a)+F(b)}{a+b}$

(b) $m = \dfrac{F(b)-F(a)}{b-a}$

(c) $m = \dfrac{a}{b}$

(d) $m = \dfrac{F(a)-F(b)}{b-a}$

(e) $m = \dfrac{F(a)-F(b)}{a-b}$

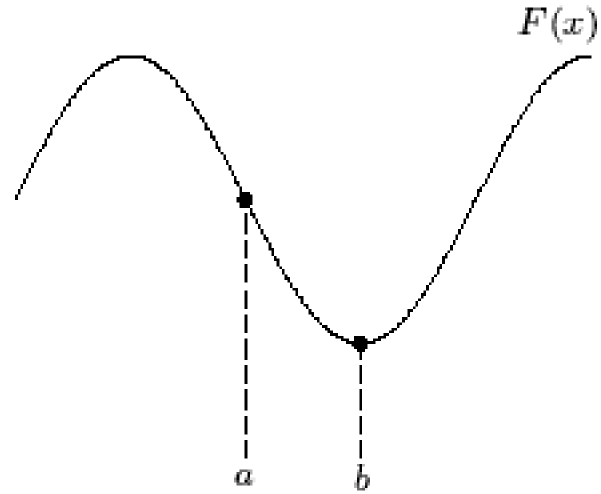

Figure 2.4

Which of the following expressions represents the slope of a line drawn between the two points marked in Figure 2.5?

(a) $\dfrac{F(\Delta x) - F(x)}{\Delta x}$

(b) $\dfrac{F(x+\Delta x) - F(x)}{\Delta x}$

(c) $\dfrac{F(x+\Delta x) - F(x)}{x}$

(d) $\dfrac{F(x+\Delta x) - F(x)}{x + x - \Delta x}$

(e) $\dfrac{F(x+\Delta x) - F(x)}{x+\Delta x}$

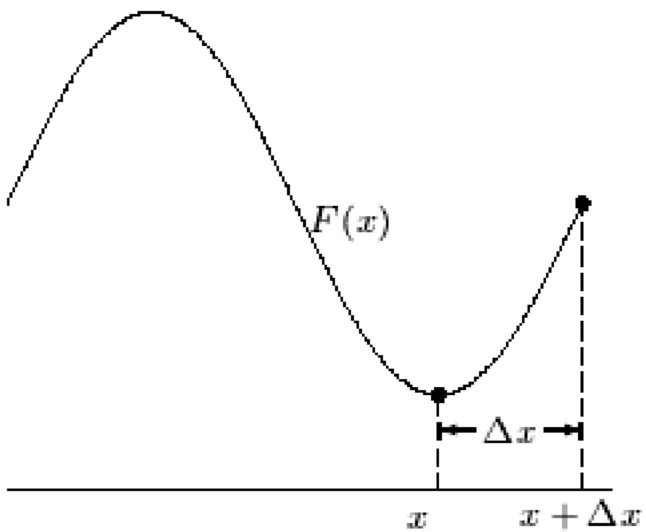

Figure 2.5