Exercise 67
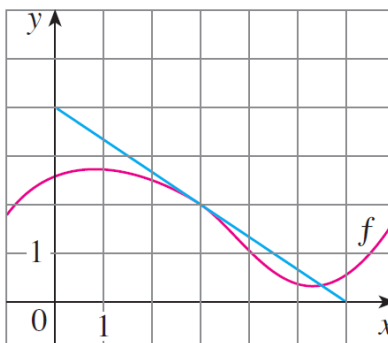
If $g(x) = \sqrt{f(x)}$, where the graph of f is shown, evaluate $g'(3)$.

Solution

Take the derivative of $g(x)$.

$$g'(x) = \frac{1}{2}[f(x)]^{-1/2} \cdot \frac{d}{dx}[f(x)]$$

$$= \frac{f'(x)}{2\sqrt{f(x)}}$$

Evaluate it at $x = 3$.

$$g'(3) = \frac{f'(3)}{2\sqrt{f(3)}}$$

$$= \frac{-\frac{2}{3}}{2\sqrt{(2)}}$$

$$= -\frac{1}{3\sqrt{2}}$$

$$\approx -0.236$$

The blue tangent line at $x = 3$ was used to determine the slope of $f(x)$ there.