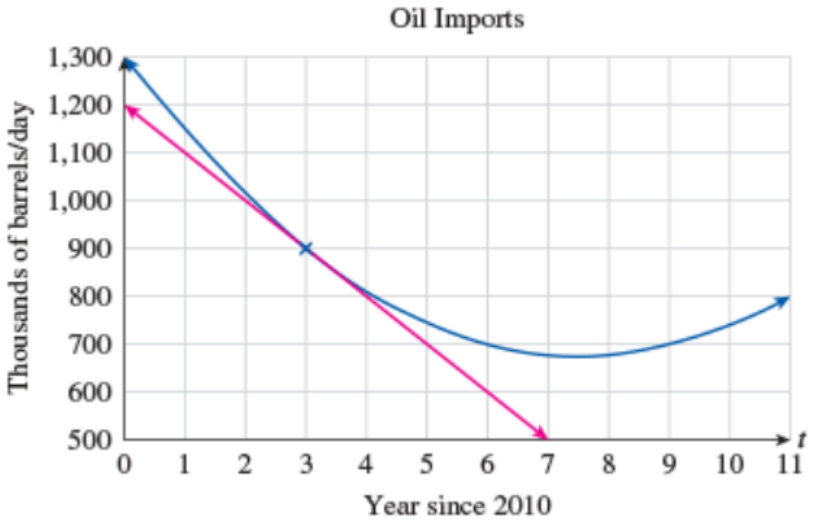
The Derivative From a Graphical and Algebraic View (Sec 10.5, 10.6)

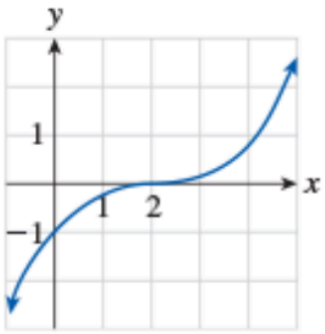
81. Oil Imports from Mexico The following graph shows approximate daily oil imports to the United States from Mexico. * Also shown is the tangent line at the point corresponding to year 2013.



a. Estimate the slope of the tangent line shown on the graph. What does the graph tell you about oil imports from Mexico in 2013? [**Hint:** Identify two points on the tangent line.

b. According to the graph, is the rate of change of oil imports from Mexico increasing, decreasing, or decreasing then increasing? Why?

35. Let f have the graph shown.



a. The average rate of change of f over the interval $[2, 4]$ is

A. greater than $f'(2)$.

B. less than $f'(2)$.

C. approximately equal to $f'(2)$.

b. The average rate of change of f over the interval $[-1, 1]$ is

A. greater than $f'(0)$.

B. less than $f'(0)$.

C. approximately equal to $f'(0)$.

c. Over the interval $[0, 2]$, the instantaneous rate of change of f is

A. increasing.

B. decreasing.

C. neither.

Use limits to calculate each derivative. (Sec 10.6)

1) $f(x) = 5x^2 + 4x$

a) Find $f'(x)$

b) Find $f'(1)$

2) $f(x) = \frac{x}{x+1}$

a) Find $f'(x)$

b) Find $f'(2)$

3) $f(x) = 6x + 7$

a) Find $\frac{df}{dx}$

b) Find $\frac{df}{dx}$ at $x = 3$

4) Find the equation of the tangent line to $f(x) = x^3 + 1$ at $x = 2$

51. Revenue: 5G Smartphones Worldwide annual sales of 5G smartphones in 2020–2024 were projected to be $q(p) = -2.5p + 1{,}850$ **million** phones at a selling price of $\$p$ per phone.

a. Calculate the resulting revenue function $R(p)$ and its derivative $R'(p)$, as a function of the unit price p. [**Hint:** $\text{Revenue} = p \times q(p)$; see Example 3 in Section 2.1.]

b. Calculate and interpret $R(380)$ and $R'(380)$.

c. In light of the results of part (b), if the selling price is $\$380$ per phone, in which direction should the selling price move in order to increase the total revenue? Explain.