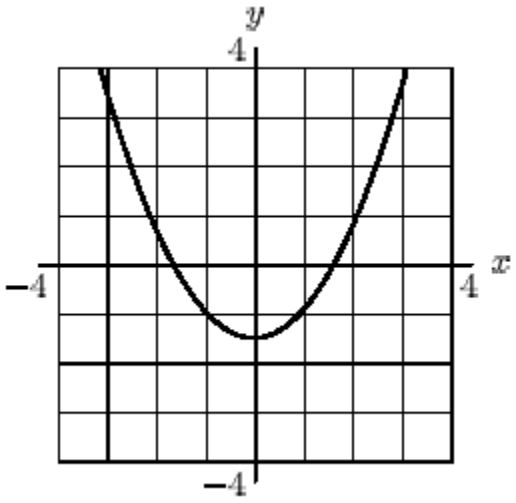
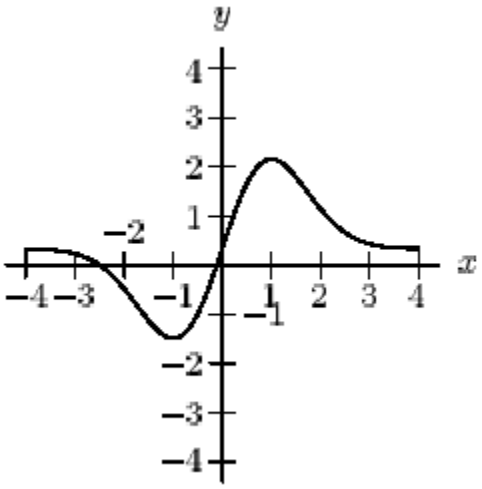
Calc 2 HW 2 due Thus.18.Nov: **Ch.2.4** # 3, 7, 18, 20, 29, 30, 39
Solutions courtesy of publisher

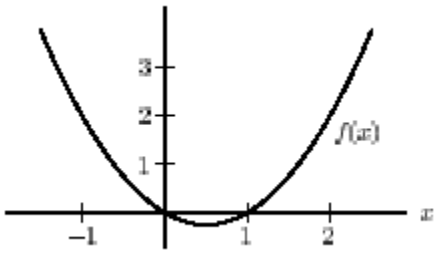
Ch.2.4 # 3

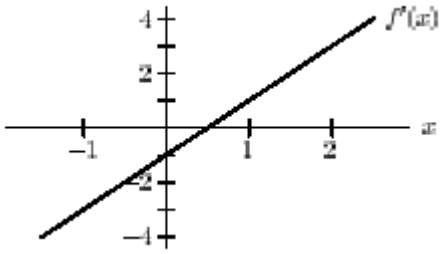


Ch.2.4 # 7

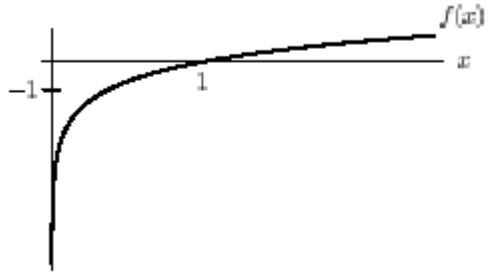


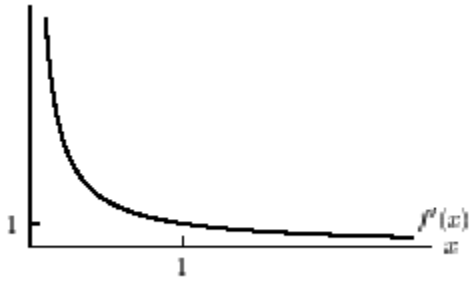
Ch.2.4 # 18



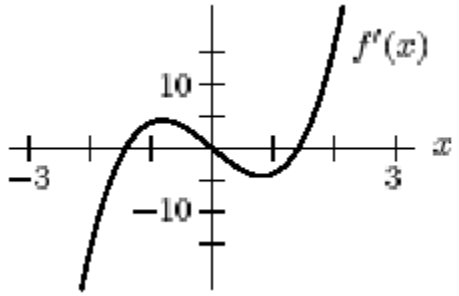


Ch.2.4 # 20





Ch.2.4 # 29



Ch.2.4 # 30

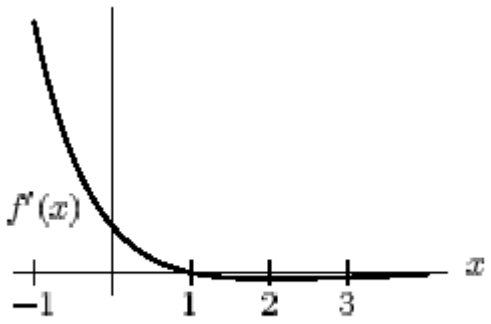
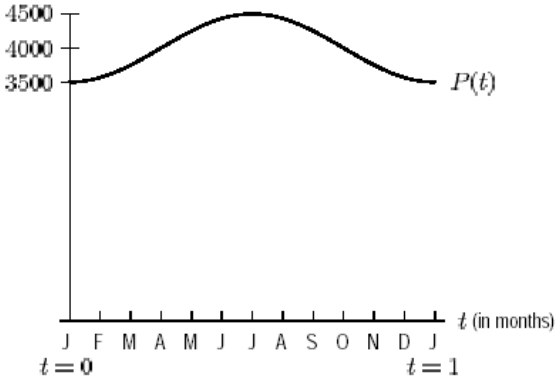


Figure 2.32

30. This function is increasing for $x < 1$ and is decreasing for $x > 1$ so the derivative is positive for $x < 1$ and negative for $x > 1$. In addition, as x gets large, the graph of $f(x)$ gets more and more horizontal. Thus, as x gets large, $f'(x)$ gets closer and closer to **0**. One possible graph is shown in Figure 2.32.

Ch.2.4 # 39

(a) The population varies periodically with a period of 1 year. See below.



(b) The population is at a maximum on July 1st. At this time $\sin(2\pi t - \frac{\pi}{2}) = 1$, so the actual maximum population is $4000 + 500(1) = 4500$. Similarly, the population is at a minimum on January 1st. At this time, $\sin(2\pi t - \frac{\pi}{2}) = -1$, so the minimum population is $4000 + 500(-1) = 3500$.

(c) The rate of change is most positive about April 1st and most negative around October 1st.

(d) Since the population is at its maximum around July 1st, its rate of change is about 0 then.