Name:

- 1. A manufacturer sells quality pens at a price of \$14 per pen, and at this price consumers have been buying 12,000 pens a month. The manufacturer estimates that for each \$1 increase in the price, 1,000 fewer pens will be sold. Similarly, for each \$1 decrease in price, 1,000 more pens will be sold. The manufacturer can produce the pens at a cost of \$10 per pen.
  - (a) [3 points] Express the monthly profit P as a function of the sale price x.

(b) [1 point] Find the sale price that maximizes the manufacturer's profit.

 $\mathbf{OVER} \rightarrow$ 

2. [6 parts, 1 point each] Find the indicated limit if it exists. If the limiting value is infinite, indicate whether it is  $+\infty$  or  $-\infty$ . Show your work.

(a) 
$$\lim_{x \to -1/3} (2 - 3x^2) =$$
  
(b)  $\lim_{x \to -3} \frac{x^2 + x - 6}{x + 3} =$   
(c)  $\lim_{x \to -2} \frac{x^2 + 3x + 2}{x^2 - x - 6} =$   
(d)  $\lim_{x \to 0} \frac{\sqrt{x - 3}}{x - 9} =$   
(e)  $\lim_{x \to 14} \frac{\sqrt{x + 2} - 4}{x - 14} =$   
(f)  $\lim_{x \to -\infty} \frac{5x^2 + 30x + 18}{4x + 17} =$