

**Reading** Stewart §3.5, 3.7.

1. For each of the following functions, discuss domain, horizontal and vertical asymptotes, interval(s) of increase or decrease, local extreme value(s), concavity, and inflection point(s). Then use this information to present a detailed and labeled sketch of the curve.
  - (a)  $f(x) = \frac{x}{x^2+16}$
  - (b)  $g(x) = \frac{x^2}{x^2+16}$
2. For the function  $F(x) = 3 + \frac{2}{x} + \frac{1}{x^2}$ , discuss domain, horizontal and vertical asymptotes, interval(s) of increase or decrease, local extreme value(s), concavity, and inflection point(s). Then use this information to present a detailed and labeled sketch of the curve.
3. A farmer wants to use 750 m of fencing to enclose a rectangular region and also divide it into four pens with three fences parallel to one of the sides of the rectangle. What is the largest possible area of the whole enclosed region?
4. We need a large box with a square base and open top. What is the largest possible volume of such a box that uses only  $300 \text{ ft}^2$  of material?