1) If \( f(x) = x + \frac{16}{x} + 3 \), find the relative extrema for \( f \).

2) If \( f(x) = 3x^{5/3} + 5x^{2/3} + 7 \), find the critical numbers and relative extrema for \( f \).

3) If \( f(x) = 10x^4 - x^6 \), find the open intervals on which the graph of \( f \) is concave up or concave down.

4) Let \( f(x) = \frac{16(x+1)}{(x+3)^2} \), so \( f'(x) = \frac{16(1-x)}{(x+3)^3} \) and \( f''(x) = \frac{32(x-3)}{(x+3)^4} \).

a) Find equations for the asymptotes to the graph of \( f \).
   - Vertical:
   - Horizontal:

b) Find the open intervals on which \( f \) is increasing or decreasing.

C) Find the open intervals on which the graph of \( f \) is concave up or concave down.

D) Sketch the graph of \( f \), showing all asymptotes, relative extrema, points of inflection, and intercepts.

2) A triangle is formed in the first quadrant by a line through the point (4,3) and the coordinate axes. Find the base and height of the triangle with the smallest area.

3) Find the absolute extrema of \( f(x) = x - 2 \cos x \) on \( [0, \frac{3\pi}{2}] \).

4) Sketch the graph of a rational function \( f \) with the following properties:
   a) \( x = 1 \) and \( x = 2 \) are vertical asymptotes.
   b) \( y = 1 - x \) is a slanted asymptote.
   c) \( f(-2) = -2 \) is a relative minimum.
   d) \( f(0) = -4 \) is a relative maximum.
   e) \( f(1) = 1 \) is a relative maximum.
   f) \( (1, -2) \) is a point of inflection.

5) Find the largest possible area of a rectangle which can be inscribed in a semicircle of radius 6.

6) Just set up a function of 1 variable to be maximized or minimized in the following problems:
   a) A hiker in the desert is 4 miles from a straight road, and she can walk 2 mph off the road and 3 mph on the road. Find the shortest time required for her to walk to a town which is 6 miles down the road (from the point on the road closest to her).

   b) A cylindrical can with a volume of 60\pi \text{ in}^3 is to be produced using material that costs 25\$/\text{in}^2 for the top and bottom and 10\$/\text{in}^2 for the side. Find the radius and height of the least expensive can.