

Determine each of the following for the functions in problems 1 and 2:

- x- and y-intercepts
- Symmetry
- Asymptotes (HA & VA)
- Intervals increasing / decreasing – *on sign chart*
- Max and min – *on sign chart*
- Concavity & inflection points – *on sign chart*

Then sketch the graph

- Plotting any max, min, or inflections points
- Showing the HA & VA, and
- Connecting the points with the correct shape using the information from the derivative and second derivative.

1. $f(x) = \frac{5-x}{x+3}$

2. $g(x) = 4x^3 - 8x^5$

3. Explain how to determine whether a function has a maximum or minimum at some x -value where the derivative is zero and also explain how to determine whether a function has an inflection point.

4. A box with a square base is to have a volume of 4 cubic feet. Find the dimensions which require the least amount of material. (Disregard the thickness of the material and waste in construction.)

5. Alternate problem: A hotel (with 60 rooms) charges \$80 per day for a room and gives a special discount if more than 30 rooms are reserved. For each room over 30 rented out, the price of the room drops by \$2. How many rooms must be rented for the hotel to maximize its daily revenue?]