

Homework #7

Name: _____

StudentID: _____

Major: _____

Justify your solutions and show all your steps. Write down formulae used.

1. Let $f(x) = \frac{2}{3}x^3 + \frac{3}{2}x^2 - 2x$. Let G_f be its graph. The goal is to sketch the graph.
 - (a) Find the first three derivatives of the function.
 - (b) Find the y - intercepts and the x -intercepts (zeros).
 - (c) Find the zeros of the first derivative.
 - (d) Use this to find the extrema. Determine if they are maxima or minima or neither.
 - (e) Determine where the graph is increasing and where decreasing.
 - (f) Find the zeros of the second derivative.
 - (g) Use this to find possible inflection points. Use the third derivative to make sure you really found an inflection point.
 - (h) Determine by using the first derivative if it's a saddle point.
 - (i) Use your information to graph the function.

2. Do the same for the function

$$f(x) = \frac{x^2 + 4}{x^2}$$

taking asymptotes into account.