

MAC 2311 Calculus—Analytic Geometry

Exam #1

Please hand in your solutions by Mar 19, 2007, 7 p.m. Solutions that are handed in later will be graded with 0 points.

Problem 0: Identification (1P)

Write your name on each sheet of paper you are using ;-).

Problem 1: Graphing a polynomial (9P)

Consider the function

$$f(x) := \frac{3x^5 - 20x^3}{32} .$$

- Show that $f(x)$ is an odd function, i. e., that its graph is symmetric with respect to the origin.
- Determine the x -intercepts of the graph of f , i. e., the x -values satisfying $f(x) = 0$.
- Determine where f is increasing and where it is decreasing.
- Determine all local maxima and minima of f .
- Where is f concave upward, where is it concave downward?
- Determine the points of inflection of f .
- Determine $\lim_{x \rightarrow \infty} f(x)$ and $\lim_{x \rightarrow -\infty} f(x)$
- Sketch the graph of f .

Problem 2: Graphing a rational function (10P)

Consider the function

$$g(x) := \frac{x^2 - 2x + 4}{x - 2} .$$

- Determine the domain of g .
- Determine all horizontal, vertical and slant asymptotes of g .
- Find all local extrema of g .
- Find all inflection points of g .
- Sketch the graph of g .

Good luck & have fun!!!