

MATH 80: TEST #3

ALEX IOSEVICH

Problem #1. Graph the following function, indicating all the local maxima, local minima, inflection points, regions of concavity, and asymptotes.

$$f(x) = 2x^3 + 9x^2 - 24x + 5.$$

Problem #2. A race car drives around a circular track of radius 1 kilometer at a constant speed of 300 kilometers an hour. A radar gun is placed 2 kilometers from the center of the track. How fast is the distance between the car and the radar gun increasing when the distance between them is 2 kilometers?

Problem #3. Compute the following limits.

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{4x^2 - 3x + 5}}{x}.$$

$$\lim_{x \rightarrow \infty} x(\sqrt{x^4 + x} - \sqrt{x^4 - x}),$$

Problem #4. A rocket is launched upwards from a 500 foot high building with an initial speed of 1000 ft/sec. Use anti-derivatives to derive the formula for the position of the rocket as a function of time.

Problem #5. Show that of all the isosceles triangles with a given perimeter P , the one with the greatest area is equilateral.