

Quiz 9

Name: _____

Concavity

Math 408D:

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Problem 1.

1. Show that a quadratic polynomial $f(x) = ax^2 + bx + c$, where a , b , and c are real numbers, always has one critical point and no points of inflection. When is f concave up? Concave down?
2. Suppose f has two real roots, r and s . Show that $f'(r) + f'(s) = 0$ and that the critical point of f is midway between these roots.

Problem 2.

1. Show that $e^x \geq 1 + x$ for all $x \geq 0$.
2. Show that $e^x \geq 1 + x + \frac{1}{2}x^2$ for all $x \geq 0$.