Class 21

Friday October 23

Applications of Derivatives: General Rules for Optimization

Warm-Up Find the global and local extrema (maxima and/or minima) of the function $y = x^{2/3}$ on $[-2, 3]$

General Method for solving Optimization problems:

1. Draw a picture and assign appropriate variables.

2. Write a formula for the quantity to be maximized or minimized.

3. Use the conditions of the problem to eliminate one variable.

4. Determine all of the crucial points for increasing and decreasing ($\uparrow, \downarrow$).

5. Obtain the maximum or minimum, whichever is desired.

Groupwork: In groups of 3 or 4 work on the following optimization problem.

[1]. The range R of a projectile fired with an initial velocity V at an angle θ with the horizontal is $R = \frac{V^2 \sin(2\theta)}{g}$ where g is the acceleration due to gravity. Find the angle θ which maximizes the range R of the projectile.