Math 122-001 Group 3 Extra Credit

Michael Murphy: The Elasticity of Demand

- The demand curve for a product is given by, $q=7500-5p^2$, where p is the price. Find the elasticity at p=20 and p=25.

Xie Fucong: Marginal Revenue and Marginal Cost

- Let C(q) represent the cost and R(q) represent the revenue, in dollars, of producing q items.

  A) If C(50)=4300 and C'(50)=24, estimate C(52).

  B) If C'(50)=24 and R'(50)=35, approximately how much profit is earned by the 51^{st} item?

  C) If C'(100)=38 and R'(100)=35, should the company produce the 101^{st} item? Why or why not?

Logan Muckle: Second Derivative Test

- Use the second derivative test to examine the relative extrema of the following functions:

  (I) $f(x)=x(12-2x)^2$

  (II) $f(x)=(x^2+250)/x$

Alina Smoleva: Global Max and Global Min.

- The demand equation for a product is given by $q=1200-3p^2$.

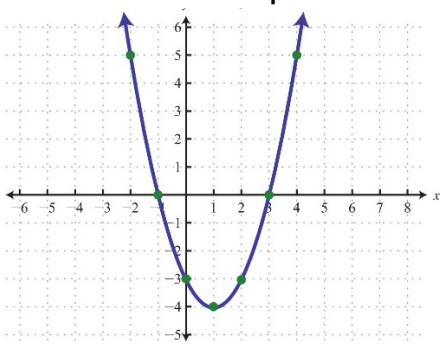
  A) Find the price that maximizes revenue of this product.

  B) Find the price that minimizes revenue.

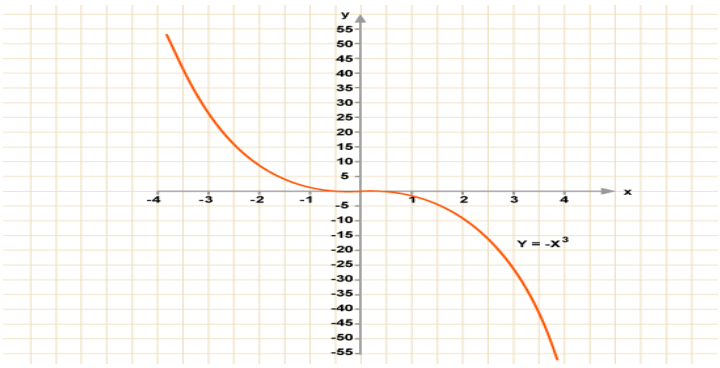
Emma Wingard: Local Max, Local Min, and Critical Points

1. A company's revenue can be modeled by the function f(x)=-6x^2+16x+10, which has a critical point at x=16/12. Is this a local maximum, minimum, or neither?
2. How many critical points are there on the function of f(x)=x^3+(5x^2)/2+2x-lnπ? Where are they?

3. This is a graph of f'(x). Where are the critical points? Are they local maxima, minima, or neither?



4. This is a graph of f(x). There is a critical point at x=0. Is this a local max, local min, or neither?



Jordan Bishop: Logistic Growth

- Ten grizzly bears were introduced to a national park 10 years ago.

  There are 23 bears in the park at the present time.

  The park can support a maximum of 100 bears. Assuming a logistic growth model, when will the bear population reach 50? 75? 90?

Frances Hutto: Relative Rate of Change

If $f(x)= x^{2,}$ what is the relative rate of change?

Andrew Brancato: First Derivative Test

- Find where the function $f(x)=1- (1/x^2)$ is increasing and decreasing.
- For the function $f(x)= (x^2+3x+2)/(x^2-3x+2)$, find whether each critical point is a local max, local min, or neither.

Sara King: Instantaneous Rate of Change

* *The **instantaneous rate of change** tells you how fast y is changing with respect to x at any value of x. It is also called the derivative, and it is the slope of the line tangent to a graph at any point.

1. Carlos has taken an initial dose of a prescription medication. The amount of medication, in milligrams, in Carlos's bloodstream after *t* hours is given by the following function:
M(t)= 20e^-.8t
What is the instantaneous rate of change of the remaining amount of medication after 1 **hour?**

2. *C*gives the cost, in dollars, to shred w pounds of confidential documents of a company.
C(w)= 0.001w^3 - 0.15w^2 +7.5w
What is the instantaneous rate of change of the costs when the weight of the documents is 10 pounds?