Name: _____ **AP**

Classwork 47

Checklist for solving Max/Min problems with calculus:

1) Define the variables
2) Write an equation relating the variables
3) Write a formula or function for what you want to maximize or minimize
4) Isolate one variable
5) Substitute so that the function in (3) has only one variable it depends on
6) Take the derivative
7) Set the derivative equal to zero
8) Solve for x

1. Two numbers multiply to 100. Minimize their sum.

a) Give some examples. What do you think the answer will be near?

b) Use calculus to find the exact answer.

1)

2)

3)

4)

5)

6)

7)

8)

2. What point on the hyperbola $y = 1/x$ is closest to the origin?

a) Draw a graph on the calculator and hypothesize what the answer should be.

b) Use calculus to find the exact answer.

1)

2)

3)

4)

5)

6)

7)

8)

3. Lily wants to draw a rectangle under the curve $y = -3/2x + 12$ with one corner of the rectangle on the origin. What is the largest (area) rectangle that can be drawn?

a) Draw a picture of what is happening. Draw and label one example rectangle.

b) Use calculus to find the exact answer.

1)

2)

3)

4)

5)

6)

7)

8)

4. The Rowing Team is selling T-shirts for $15 each. Sales are averaging 10 shirts a day. The team lowers the price to $13 each and the sales go up to 11 shirts a day.

a) If the relationship between price and sales is linear, write an equation which describes how sales (y) depend on price (x).

b) Write an equation describing how revenue (r) depends on price (x).

c) What price will give the team **maximum *revenue***?

d) Let's say each shirt costs the team $6. Calculate the **profit** the team makes from selling shirts:

i. at $15 each

ii. at $11 each

e) Write an equation describing how profit (p) depends on price (x).

f) What price should the team charge to maximize their ***profits***?