# MATH 1270 Sec 005, 007
# CALCULUS FOR THE BUSINESS WITH APPLICATIONS II
# QUIZ 2

January 31, 2011

**Name** (Last, First)_____

1. Find the absolute extrema, if they exist as well as all values of $x$ where they occur.

$$f(x) = x^3 - 3x^2 - 24x + 5, \quad [-3, 6]$$

$f'(x) = 3x^2 - 6x - 24$. Set $f'(x) = 0$ and solve for $x$.

$3x^2 - 6x - 24 = 0$

$x^2 - 2x - 8 = 0$

$(x - 4)(x + 2) = 0$

$x = -2, 4.$

$f'(x)$ is defined everywhere. Therefore the values of $x$ we need to check for maximum/minimum are $-2, 4$ and then endpoints of the intervals $-3, 6$.

$f(-2) = 33, f(4) = -75, f(-3) = 23, f(6) = -31.$

Therefore absolute maximum is attained at $-2$ and the absolute maximum is 33. Absolute minimum is attained at 4 and the absolute minimum is $-75$.

2. Suppose 100,000 lamps are to be manufactured annually. It costs \$1 to store a lamp for 1 year, and it costs \$500 to set up the factory to produce a batch of lamps. Find the number of lamps to produce in each batch.

$M = 100,000$

$f = 500$

$k = 1$

Therefore $q = \sqrt{\frac{2Mf}{k}} = \sqrt{\frac{2 \cdot 100,000 \cdot 500}{1}} = 10,000$