Name: _____ Date: _____

AP Calculus AB: Extreme Value Theorem Ms. Loughran

Extreme Value Theorem:

In a closed interval, extreme values occur at critical points or at endpoints. [Candidate Test]

To find extrema on a closed interval:

Suppose that *f* is continuous and has exactly one relative minimum or exactly one relative maximum on an interval *I,* then that value is the absolute minimum/ absolute maximum on that interval.

For the following, find the extreme values of *f* and where they occur.

1. $f(x) = 2x^3 - 3x^2 - 36x \qquad [1,5]$

2. $f(x) = 6x^{\frac{4}{3}} - 3x^{\frac{1}{3}} \qquad [-1,1]$

3. $f(x) = \ln(x+1) \qquad [0,3]$

4. $f(x) = \sin\left(x + \frac{\pi}{4}\right) \qquad \left[0, \frac{7\pi}{4}\right]$