UMass Boston - Math 140 - Summer 2007 **Guest Student**
WeBWorK assignment 12-CurveSketching
Due: 08/09/2007 at 10:00pm EDT

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1. (1 pt) Consider the function $f(x) = -2x^3 + 36x^2 - 192x + 7$. For this function there are three important intervals: $(-\infty, A]$, $[A, B]$, and $[B, \infty)$ where A and B are the critical numbers.
Find A _____
and B _____
For each of the following intervals, tell whether $f(x)$ is increasing (type in INC) or decreasing (type in DEC).
$(-\infty, A]$: _____
$[A, B]$: _____
$[B, \infty)$ _____
$f(x)$ has an inflection point at $x = C$
where C is _____
Finally for each of the following intervals, tell whether $f(x)$ is concave up (type in CU) or concave down (type in CD).
$(-\infty, C]$: _____
$[C, \infty)$ _____

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2. (1 pt) Consider the function $f(x) = 5x + 2x^{-1}$. For this function there are four important intervals: $(-\infty, A]$, $[A, B)$,$(B, C]$, and $[C, \infty)$ where A, and C are the critical numbers and the function is not defined at B.
Find A _____
and B _____
and C _____
For each of the following intervals, tell whether $f(x)$ is increasing (type in INC) or decreasing (type in DEC).
$(-\infty, A]$: _____
$[A, B)$: _____
$(B, C]$: _____
$[C, \infty)$ _____
Note that this function has no inflection points, but we can still consider its concavity. For each of the following intervals, tell whether $f(x)$ is concave up (type in CU) or concave down (type in CD).
$(-\infty, B)$: _____
(B, ∞): _____

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3. (1 pt) Consider the function $f(x) = \frac{2x+6}{4x+3}$. For this function there are two important intervals: $(-\infty, A)$ and (A, ∞) where the function is not defined at A.
Find A _____
For each of the following intervals, tell whether $f(x)$ is increasing (type in INC) or decreasing (type in DEC).
$(-\infty, A)$: _____
(A, ∞) _____
Note that this function has no inflection points, but we can still consider its concavity. For each of the following intervals, tell whether $f(x)$ is concave up (type in CU) or concave down (type in CD).
$(-\infty, A)$: _____
(A, ∞) _____

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4. (1 pt) Consider the function

$$f(x) = 3x^3 - 3x^2 - 1x - 1$$

Find the average slope of this function on the interval $(2, 3)$. _____
By the Mean Value Theorem, we know there exists a c in the open interval $(2, 3)$ such that $f'(c)$ is equal to this mean slope. Find the value of c in the interval which works _____

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5. (1 pt) Consider the function $f(x) = 2x^3 - 4x$ on the interval $[-3, 3]$. Find the average or mean slope of the function on this interval. _____
By the Mean Value Theorem, we know there exists at least one c in the open interval $(-3, 3)$ such that $f'(c)$ is equal to this mean slope.
For this problem, there are two values of c that work. The smaller one is _____ and the larger one is _____