Math 171 - Quiz 9

November 1, 2012

Name __key__

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (6 points) Let $g(x) = x^4 + 2x^3 - 36x^2 + x - 7$. Find open intervals on which the graph of g is concave up/down. Also identify all points of inflection.

$g'(x) = 4x^3 + 6x^2 - 72x + 1$
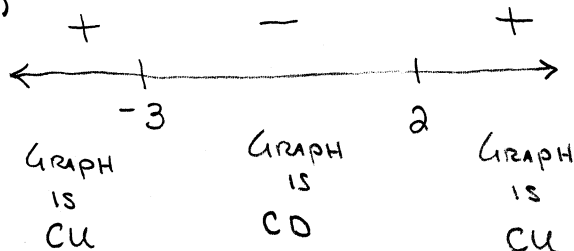
$g''(x) = 12x^2 + 12x - 72$

$g''(x)$ IS DEFINED EVERYWHERE.

$g''(x) = 0 \Rightarrow 12(x^2 + x - 6) = 0$

$12(x+3)(x-2) = 0$

$x = -3, \quad x = 2$

SIGNS OF $g''(x)$

GRAPH OF g IS

CONCAVE UP ON

$(-\infty, -3) \cup (2, \infty)$

GRAPH IS CONCAVE DOWN ON $(-3, 2)$

$(-3, -307)$ AND $(2, -117)$ ARE INFLECTION POINTS.

2. (4 points) The table below gives the values of a function f and it first two derivatives at selected values of x. Determine which row gives the data for f, which row gives the data for f', and which row gives the data for f''. Explain your reasoning.

x	0.00	0.33	0.66	1.00	1.33	1.66	2.00	2.33	2.66	3.00
$A(x)$	0.00	0.64	1.14	1.38	1.28	0.84	0.08	−0.89	−1.91	−2.83
$B(x)$	0.00	0.11	0.41	0.84	1.30	1.66	1.82	1.69	1.22	0.42
$C(x)$	2.00	1.78	1.16	0.24	−0.83	−1.85	−2.65	−3.07	−3.00	−2.40

$A(x) = f'(x)$

$B(x) = f(x)$

$C(x) = f''(x)$

$B(x)$ IS INCREASING WHERE $A(x)$ IS POSITIVE AND DECREASING WHERE $A(x)$ IS NEGATIVE. THIS PROVIDES EVIDENCE THAT $B'(x) = A(x)$.

SIMILAR ANALYSIS FOR $A(x)$ AND $C(x)$ SUGGESTS THAT $A'(x) = C(x)$.