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Quiz 5 Calculus 1 10/23/2012

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. If $f(x) = 2x^3 - 3x^2 - 72x + 30$, find the intervals on which f is increasing and decreasing.

$f'(x) = 6x^2 - 6x - 72$

$0 = 6(x^2 - x - 12)$

$0 = 6(x - 4)(x + 3)$

$x = 4$ or $x = -3$

$f'(0) = -70$

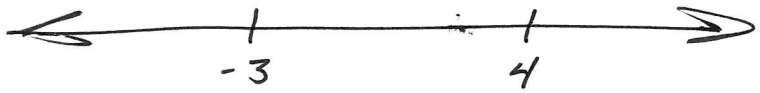
$f'(5) = 6 \cdot 5^2 - 6 \cdot 5 - 72 > 0$

$f'(-4) = 6 \cdot 16 - 6 \cdot -4 - 72 > 0$

$f'(-4) > 0$ increasing on $(-\infty, -3)$

$f'(0) < 0$ decreasing on $(-3, 4)$

$f'(5) > 0$ increasing on $(4, \infty)$



2. If $f(x) = 2x^3 - 3x^2 - 72x + 30$, find the intervals on which f is concave up or concave down.

$f'(x) = 6x^2 - 6x - 72$

$f''(x) = 12x - 6$

$0 = 6(2x - 1)$

$x = 1/2$

$f''(1) = 12 - 6 > 0$

$f''(0) = 0 - 6 < 0$

$f''(0) < 0$ concave down on $(-\infty, 1/2)$

$f''(1) > 0$ concave up on $(1/2, \infty)$