18 Oct 10

- Finish Quiz
- Homework ✓ & Q & A
- Analyze a function (extra credit)
- Derivative of base e exponentials
- AP Calculus Multiple-Choice practice
- Questions concerning Monday's Test
- Homework Assignment

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SAT II

26	D	85
27	B	70
28	C	65
29	E	47
30	D	73

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SAT II	5
3.3 & 3.4	14
3.5	4

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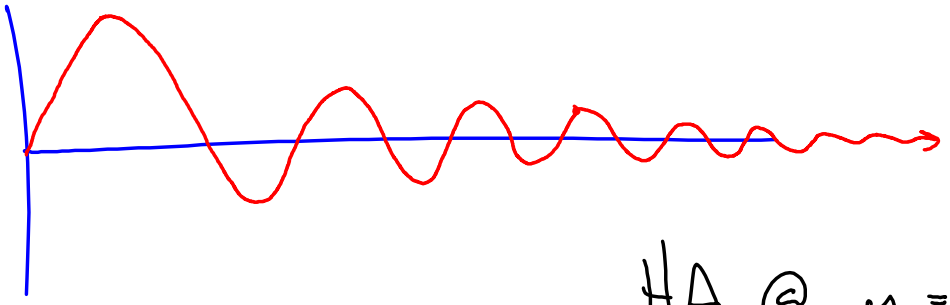
(31) $\lim_{x \to \infty} \frac{\sin 2x}{x} = 0$



HA @ $y = 0$

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3.4

(17) $f(x) = x(x+3)^{1/2}$

$f'(x) = x \cdot \frac{1}{2}(x+3)^{-1/2} \cdot 1 + (x+3)^{1/2}(1)$

$= \frac{1}{2}x(x+3)^{-1/2} + (x+3)^{1/2}$

$= (x+3)^{-1/2}\left(\frac{1}{2}x + x + 3\right)$

$= (x+3)^{-1/2}\left(\frac{3}{2}x + 3\right)$

$f''(x) = (x+3)^{-1/2}\left(\frac{3}{2}\right) + \left(\frac{3}{2}x+3\right)\left(-\frac{1}{2}\right)(x+3)^{-3/2}(1)$

$= (x+3)^{-3/2}\left[(x+3)\left(\frac{3}{2}\right) + -\frac{1}{2}\left(\frac{3}{2}x+3\right)\right]$

$= (x+3)^{-3/2}\left[\frac{3}{2}x + \frac{9}{2} - \frac{3}{4}x - \frac{3}{2}\right]$

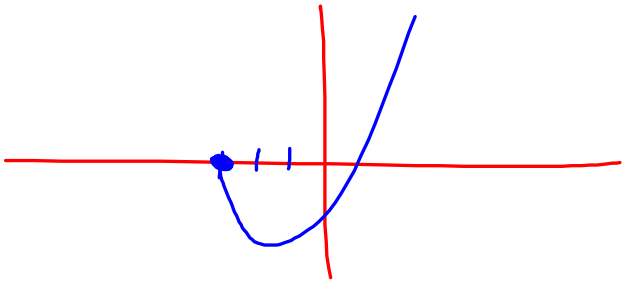
$= (x+3)^{-3/2}\left[\frac{3}{4}x + 3\right]$

$= \frac{\frac{3}{4}x + 3}{(x+3)^{3/2}} \Rightarrow \frac{3}{4}x + 3 = 0$

$\frac{3}{4}x = -3$

$3x = -12 \Rightarrow x = -4$

	-4	-3	
	DNE	0	
f''		+	
f	DNE	CU	



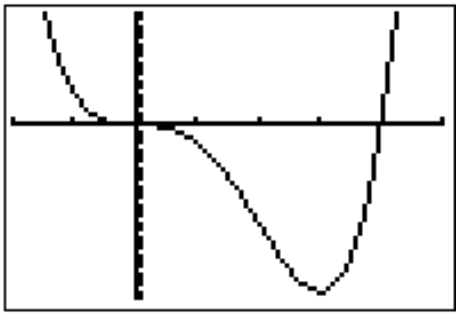
No point of inflection

:(

PUTTING IT ALL TOGETHER

Fully ANALYZE $f(x) = x^4 - 4x^3$

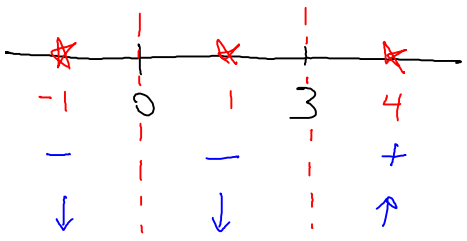
① describe the monotonicity
② identify & justify any relative extrema
③ describe the concavity
④ identify & justify any pts of inflection
⑤ have a nice day ☺



$f'(x) = 4x^3 - 12x^2 = 4x^2(x-3)$

c#'s : $x = 0$, $x = 3$

increasing: $(3, \infty)$ decreasing: $(-\infty, 0), (0, 3)$

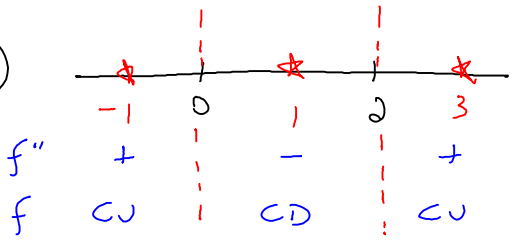


By virtue of the first derivative test, $(3, f(3))$ is a relative minimum because f' changes sign from negative to positive about the value $x = 3$.

$f''(x) = 12x^2 - 24x = 12x(x-2)$

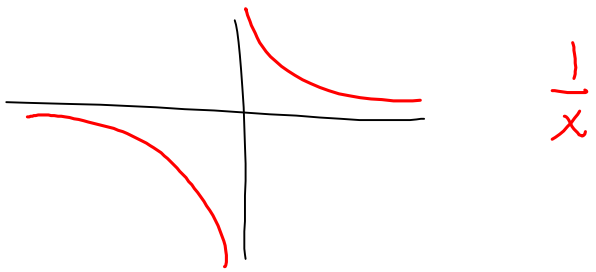
c#'s : $x = 0$, $x = 2$

concave up: $(-\infty, 0), (2, \infty)$ concave down: $(0, 2)$



$(0, f(0))$ is a point of inflection because f'' changes sign about $x = 0$ and $x = 0$ is in the domain of f.

$(2, f(2))$ is a point of inflection because f'' changes sign about $x = 2$ and $x = 2$ is in the domain of f.



$\frac{1}{x}$

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$f(x) = e^x \Rightarrow f'(x) = e^x$

it's not : $f'(x) \neq x e^{x-1}$

But!

$f(x) = e^{2x^3}$

$f'(x) = 6x^2 e^{2x^3}$

$\frac{d}{dx}\left[e^u\right] = e^u \frac{du}{dx}$

$f(x) = 2e^{x^4} \Rightarrow f'(x) = 2 \cdot 4x^3 e^{x^4}$

$= 8x^3 e^{x^4}$

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Homework Assignment

- Scan assignment due 26oct10
- Study for Test on 25oct10
- Read 3.7 & 3.9
- LHE Chapter 3 Review #'s 15, 18, 23, 24, 33, 35
- Finish AP Multiple Choice Quiz #1 Limits

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