4.2 Day 1

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Wednesday, November 07, 2012
6:22 PM

15. $f(x) = 5x - x^2$

$f'(x) = 5 - 2x$
$0 = 5 - 2x$
$-5 = -2x$
$x = 5/2$ C.V.

$f'(x)$: $+$ | $5/2$ | $-$
max

a. There is a local max. on $f(x)$ at $\left(\frac{5}{2}, \frac{25}{4}\right)$ because $f'(x)$ goes from $+$ to $-$ @ $x = 5/2$.

b. $f(x)$ is increasing $(-\infty, 5/2]$ b/c $f'(x) > 0$ on the interval

c. $f(x)$ is decreasing $[5/2, \infty)$ b/c $f'(x) < 0$ on the interval.

21. $y = 4 - \sqrt{x+2}$

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

$0 = \frac{-1}{2\sqrt{x+2}}$ $y' \neq 0$

Since the Domain $[-2, \infty)$ we need to check -2

y': -2 (max) | neg.

a. y has a local max of $(-2, 4)$ because $x = -2$ is an endpt and $y' < 0$ to the right of $x = -2$.

b. None

c. y is decreasing $[-2, \infty)$ b/c $y' < 0$ on the interval.

26. $K(x) = \frac{x}{x^2-4}$

$K'(x) = \frac{(x^2-4) - x(2x)}{(x^2-4)^2}$

$= \frac{x^2-4-2x^2}{(x^2-4)^2}$

$= \frac{-x^2-4}{(x^2-4)^2}$

$0 = \frac{-x^2-4}{(x^2-4)^2}$

a. Since $K'(x)$ is never zero and is undefined only where $K(x)$ is undefined there are no critical points. Since there are no critical points and the domain includes no endpoints, $K(x)$ has no local extrema.

b. Since $k'(x)$ is never positive, $k(x)$ in not increasing on any interval.

c. Since $k'(x) < 0$ on wherever defined, $k(x)$ is decreasing on each interval of the domain $(-\infty,-2) \cup (-2,2) \cup (2,\infty)$

28. $g(x) = 2x + \cos x$

$g'(x) = 2 - \sin x$

$0 = 2 - \sin x$

$-2 = -\sin x$

$2 \neq \sin x$

a. since $g'(x) \neq 0$ and is never undefined there are no local extrema.

b. since $g'(x) > 0$ on its entire domain, $g(x)$ is increasing $(-\infty,\infty)$.

c. $g(x)$ is never decreasing since $g'(x)$ is always positive.

31. $f(x) = x^3 - x^2 + x + C$

32. $f(x) = -\cos x + C$

33. $f(x) = e^x + C$