MATH180 - REC NOTES
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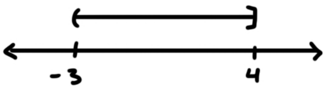
WED, AUGUST 21, 2024

open intervals ( ) - not equal to
closed intervals [ ] - equal to

4.1 inequality to interval notation

1) $-3 < x \leq 4 \rightarrow (-3, 4]$



3) $f(x) = -3x - 1$ on $(-\infty, \infty)$

d) decreasing, negative slope

4) $f(x) = 2 - \sqrt{x}$ on $(0, \infty)$

$f'(x) = -x^{1/2}$

$f'(x) = -\frac{1}{2}x^{-1/2}$ $(0, \infty)$

$f'(1) = -\frac{1}{2}(1)^{-1/2}$

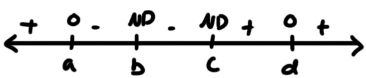
$f'(1) = -0.5$

decreasing, falls from left to right

5) Identify intervals that are decreasing

A) $(a,b), (c,d), (e,f)$

6) Determine local maxicum, minimum, or neither at each number



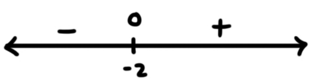
x = a) local maximum ✓

x = b) no local extremum ✓ (inflection point)

x = c) local minimum ✓

x = d) no local extremum ✓ (inflection point)

7) Match graph with correct sign chart



ND means No Derivative
(slope is perpindicular)

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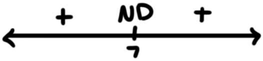
8) Match graph with sign chart

perpendicular line at $x=7$



9) $f(x)=x^3-3x-6$

$0=3x^2-3$

$0=x^2-1$

$(x+1)(x-1)=0$

A) $f'(x)=3x^2-3$

B) partition numbers:

$x=\pm 1$

C) criticle numbers:

$x=\pm 1$

Anywhere that equals 0 or DNE is a critical number

10) $f(x)=\frac{7}{x+8}$

(A) $f'(x)=$ $7(x+8)^{-1}$

$f'(x)=-7(x+8)^{-2}$

$\frac{7}{x+8}=x+8=0=x+8=-8=x$

(B) partition numbers:

$x=-8$

(C) critical numbers:

None

function still has to exist

(11) Intervals where $f(x)$ increasing, decreasing, local extrema.

$f(x)=x^3+6x-27$

$f'(x)=3x^2-6=0$

$x^2-2=0$

$(x-\sqrt{2})(x+\sqrt{2})$

$\boxed{x=\pm\sqrt{2}}$

increasing on $(-\infty,-\sqrt{2})$ and $(\sqrt{2},\infty)$

decreasing on $(-\sqrt{2},\sqrt{2})$

local

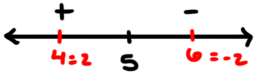
Sign was wrong. Redo on your own

13) $f(x) = 6 + 10x - x^2$

$f'(x) = 10 - 2x = 0$

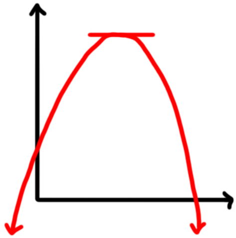
$-2x = -10$

$x = 5$



increasing on $(-\infty, 5)$

decreasing on $(5, \infty)$



14) $f(x) = 10 - 3x + 3x^2 - x^3$

$f'(x) = -3 + 6x - 3x^2 = 0$

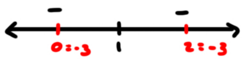
$1 - 2x + x^2 = 0$

$-1 \quad x$

$-1 \quad x$

$(-1 + x)(-1 + x) = 0$

$x = 1$



never increasing

decreasing on $(-\infty, \infty)$