Calc AB

Lesson 15

8/17/15

Agenda: 8/17/15

HW Leader:

Lesson 15

- Interval Notation
- Product of Linear functions
- [Tangents]
- Increasing/Decreasing

- Quiz returned at end

Period 3: Lucas K.

Period 4: Caroline V.

AP Definition for Continuity (Limits):

A function f is continuous at a if

1. $f(a)$ exists
2. $\lim_{x \to a} f(x) = f(a)$

Interval Notation

Open Intervals

(a, b)

$a < x < b$

Closed Intervals

$[a, b]$

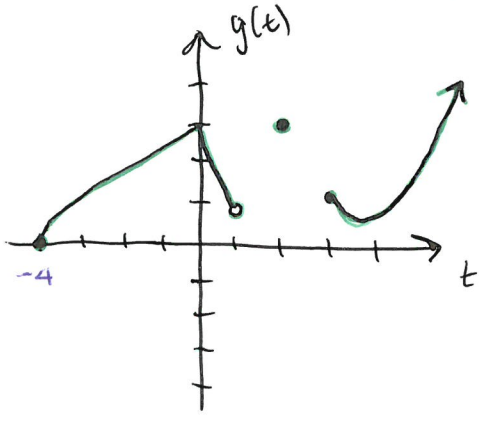
$a \leq x \leq b$

Partially Closed

$(a, b]$

$a < x \leq b$

Ex. What is the domain and range of $g(t)$ below, in interval notation?



Domain: $[-4, 1) \cup \{2\} \cup [3, \infty)$

Range: $[0, \infty)$

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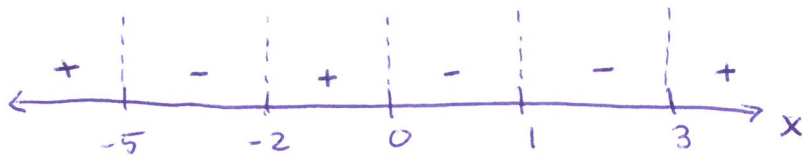
Product of Linear factors:

- A function that is a product of linear factors can only change sign at a zero.

Ex. Use a sign chart to determine where W is positive and negative:

$$W(x) = x(x-3)(x+5)(x-1)^2(x+2)$$

Sign Chart: zeros: $x = 0, 3, -5, 1, -2$



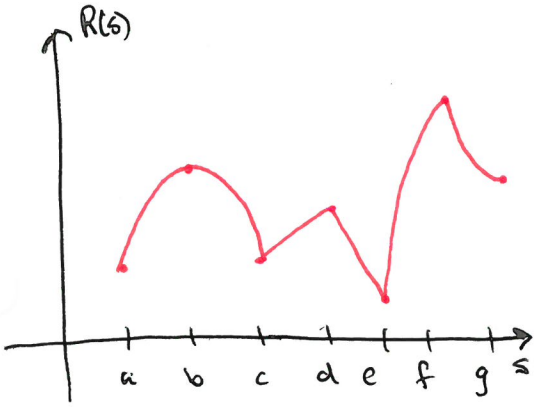
Positive: $(-\infty, -5) \cup (-2, 0) \cup (3, \infty)$

Negative: $(-5, -2) \cup (0, 1) \cup (1, 3)$

Increasing / Decreasing functions:

Def- A function f is <u>increasing</u> on the interval (a,b) if for all $x, z \in (a,b)$ with $x < z$ then $f(x) < f(z)$. Else if for all $x, z \in (a,b)$, $x < z$ we have $f(x) > f(z)$ then f is <u>decreasing</u>.

Ex. 15.5 On what intervals is the function R(s) increasing and decreasing?



Increasing: $(a,b) \cup (c,d) \cup (e,f)$

Decreasing: $(b,c) \cup (d,e) \cup (f,g)$

(Left to Right) Driving up → increasing
Driving down → decreasing