a graph of the function from the given information.

ntinuous.

$= 4, \quad f(-4) = 5 \quad f(-2) = 2,$

$4, \quad f(-6) = 7$

$= f'(-2) = 0$

$> 0 \text{ for } (-\infty,-6) \cup (-2,\infty)$

$< 0 \text{ for } (-6,-2)$

$= f''(-4) = f''(0) = 0$

$> 0 \text{ for } (-\infty,-9) \cup (-4,0)$

$< 0 \text{ for } (-9,-4) \cup (0,\infty)$

$x) = -1, \quad \lim_{x\to\infty} f(x) = 6$

State the extreme values and their type.

$= 6, \quad f(5) = 2, \quad f(-7) = 3,$

$2.5, \quad f(-2) = 4$

$= 0, \quad f'(-2) = \text{undefined}$

$0 \text{ for } (-\infty,-4) \cup (2,\infty)$

$0 \text{ for } (-4,2)$

$f''(-2) = f''(0) = 0,$

undefined

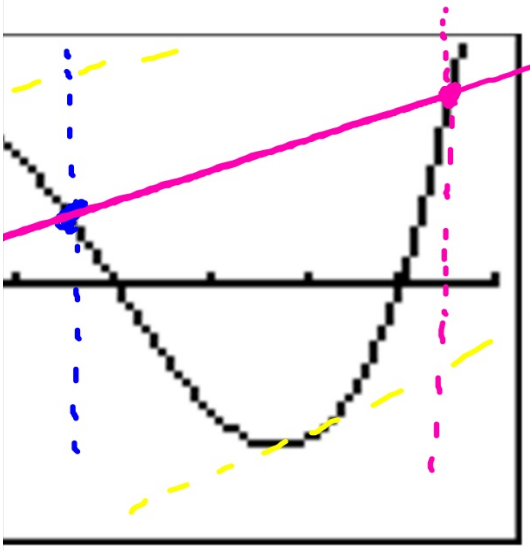
$0 \text{ for } (-\infty,-7) \cup (-2,0)$

$0 \text{ for } (-7,-2) \cup (0,2) \cup (2,\infty)$

$x) = 1, \quad \lim_{x\to\infty} f(x) = 3$

$x) = -\infty, \quad \lim_{x\to 2^-} f(x) = -\infty$

State the extreme values and their type.



2) Plot the points on the above curve and draw vertical li
x-coordinates.

3) Draw a secant line between the two plotted points.

4) Calculate the slope of the secant line.

$$m = \frac{11.375 - 4.375}{6.5 - 2.5} = \frac{7}{4}$$

5) Are there any points on the curve in the interval (2.5,
tangents have the same slope? If so, what is/are the va
they exist?

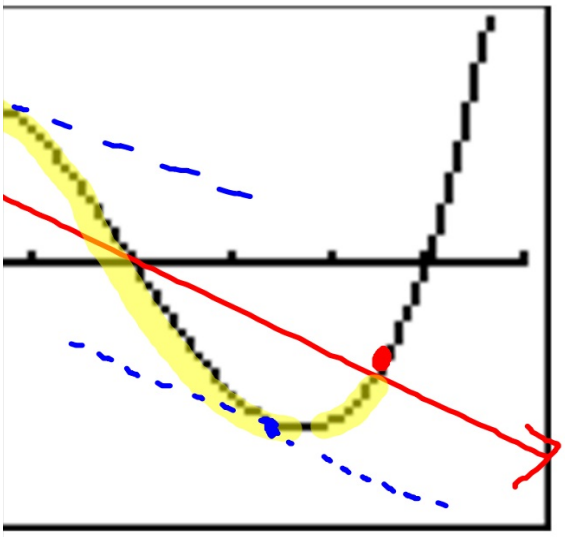
$f'(x) = 3x^2 - 18x + 18$

$3x^2 - 18x + 18 = 1.75$

$x = 4.893$

dinates when x = 2.5 and x = 6.5.

$y = 4.375$ $y = 11.375$



rdinates when x = 0.7 and x = 5.6.

$y = 8.533$

$y = -5.824$

2) Plot the points on the above curve and draw vertical l
x-coordinates.

3) Draw a secant line between the two plotted points.

4) Calculate the slope of the secant line.

$m = -2.93$

5) Are there any points on the curve in the interval (0.7
tangents have the same slope? If so, what is/are the v
they exist?

$f'(x) = 3x^2 - 18x + 18 = -2.93$

$3x^2 - 18x + 20.93 = 0$

$x = 1.578$

$x = 4.422$

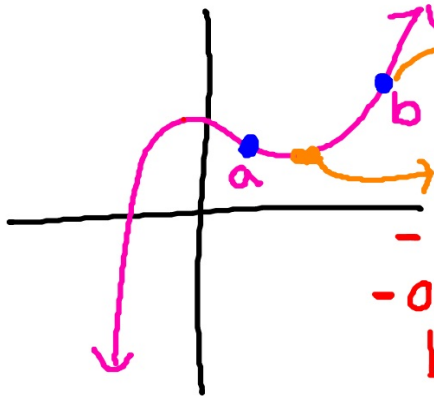
What statement can you make about the function on the two closed intervals?

Steps for MVT

1. Make sure $f(x)$ is continuous from $a \to b$.
2. Find the y-values at "a" and "b". $f(a)$ $f(b)$
3. Find the slope between the 2 points. (secant line)
4. Find derivative → set it = slope, and solve for x-values (Gives you "c")

* only choose x-values between "a" and "b"

Min/Max Existence Thm



- der. = 0
- only use x-values between a & b

Example

① $f(x) = 3x^2 + 4x$

$[-3, 5]$

$f'(x) = 6x + 4 = 0$

$6x = -4$

$x = -2/3$

$f(-3) = 15$

$f(-2/3) = -4/3$ (Min)

$f(5) = 95$ (Max)