4.2 Mean Value Theorem (MVT)

Rolle's Theorem:

then $f'(x) = 0$

at some point between a & b
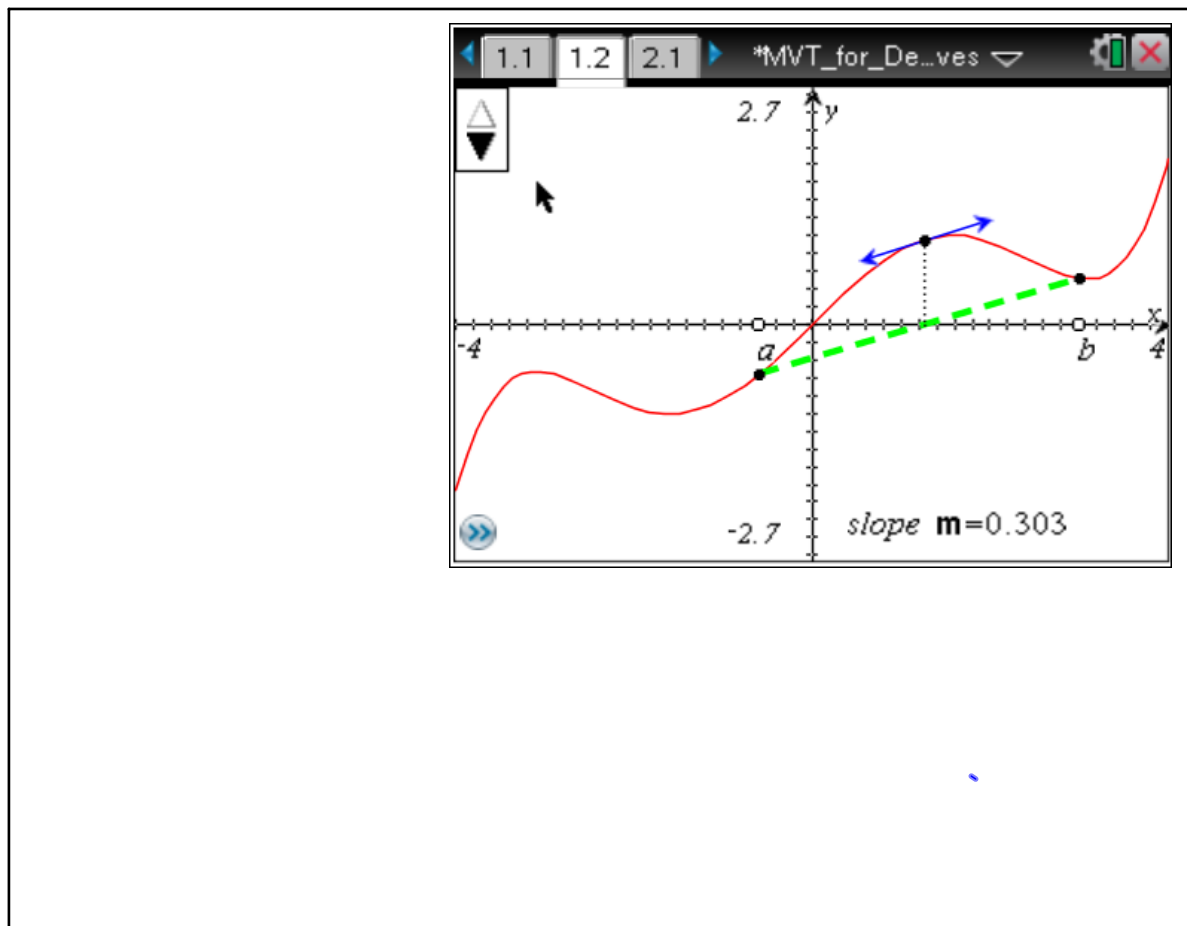
if f(a) = f(b)

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

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On your paper, start at a closed endpt (a) and draw a continuous differentiable function ending at a second closed endpt (b).

Draw the secant line representing the average rate of change.

Can you draw a tangent line to your curve - parallel to the secant line?
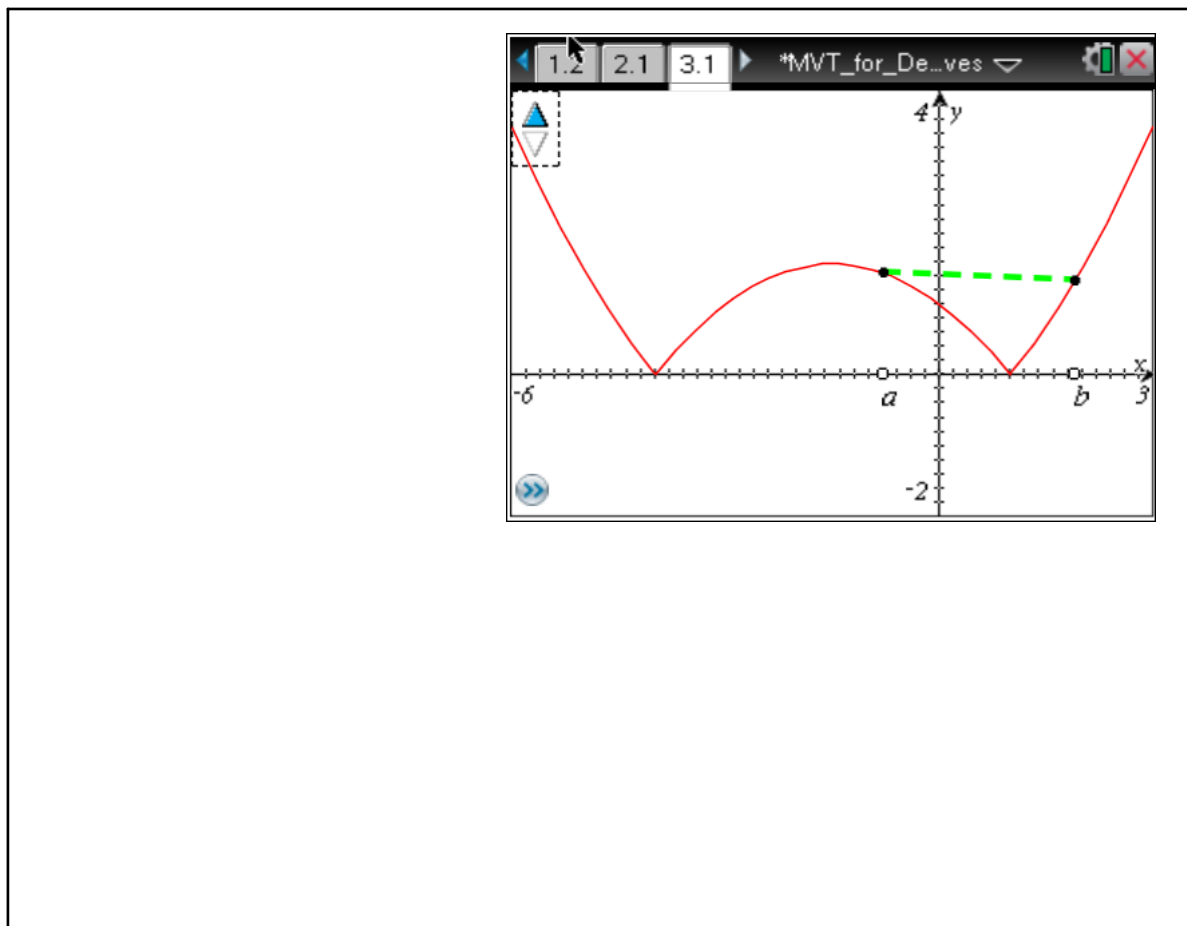
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MVT:

   if f is continuous on a closed interval [a, b] & differentiable on (a, b), then there exists a value "c" in between a & b such that:

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

meaning: there is some point where the instantaneous rate of change = the average rate of change

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Brian got a speeding ticket driving to the Kansas State football game on Saturday. He left at 1:00 p.m. and was issued a speeding ticket at 1:40 p.m. after driving for 45 miles. Brian claims he never drove over the 65 mile per hour speed limit. Use the Mean Value Theorem to plead Brian's case, or to argue against him.

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Show $f(x) = 2x^2$ satisfies the MVT over [-1,2] & find a solution

to $f'(c) = \dfrac{f(b) - f(a)}{b - a}$

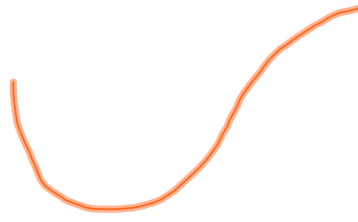Oct 13-10:57 PM

$f(x) = \sqrt{1 - x^2}$     on [-1,1]

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## Increasing & decreasing

$f'(x) > 0$

$f'(x) < 0$

$f'(x) = 0$

Where is $f(x) = x^3 - 4x$ increasing & decreasing?

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