Today's Plan:

Learning Target (standard): I will use the 1st derivative test to describe the characteristics of a function.

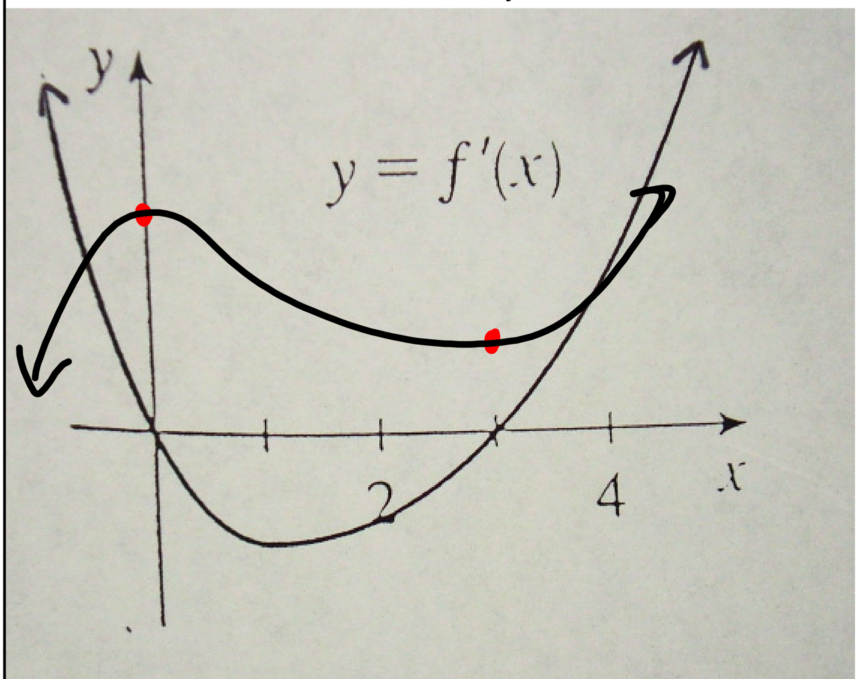
Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuarcy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

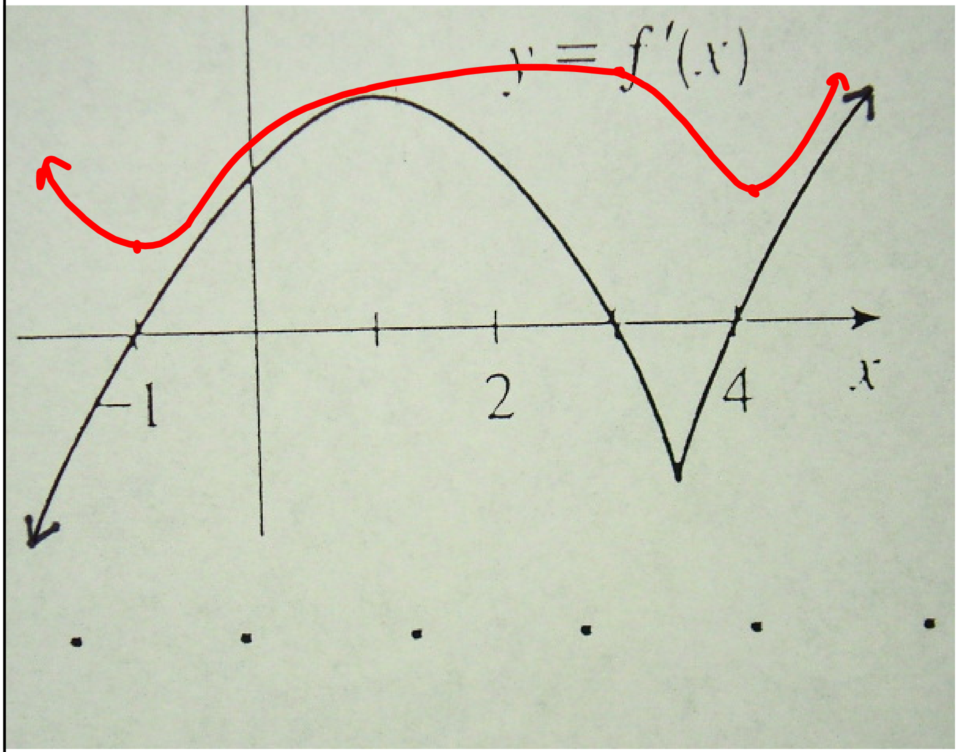
Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

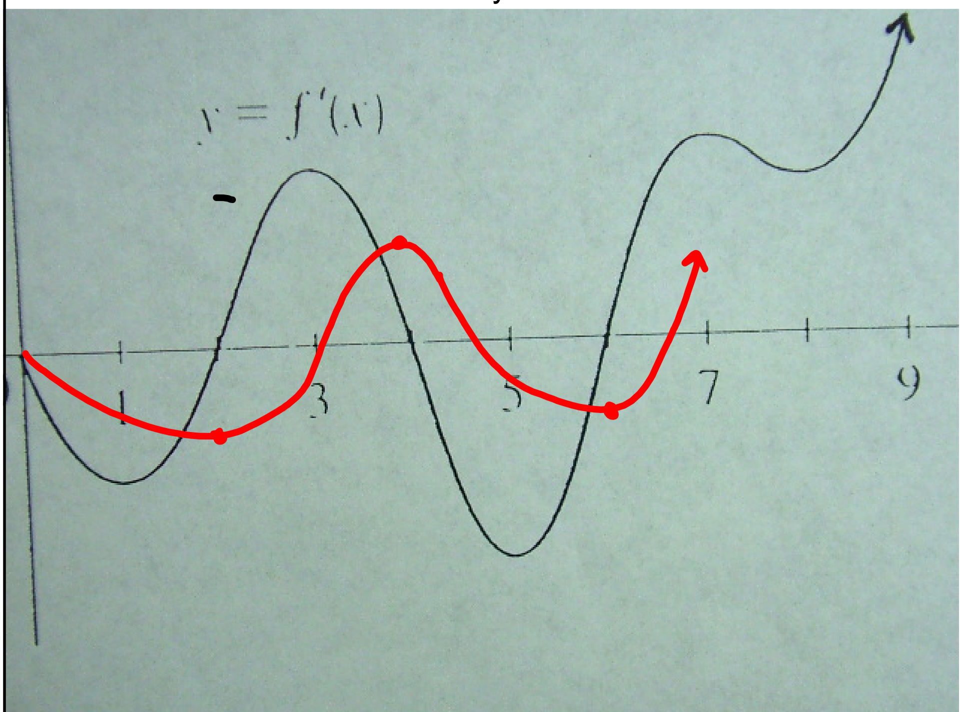
Use the 1st Derivative Test to analyze the function.



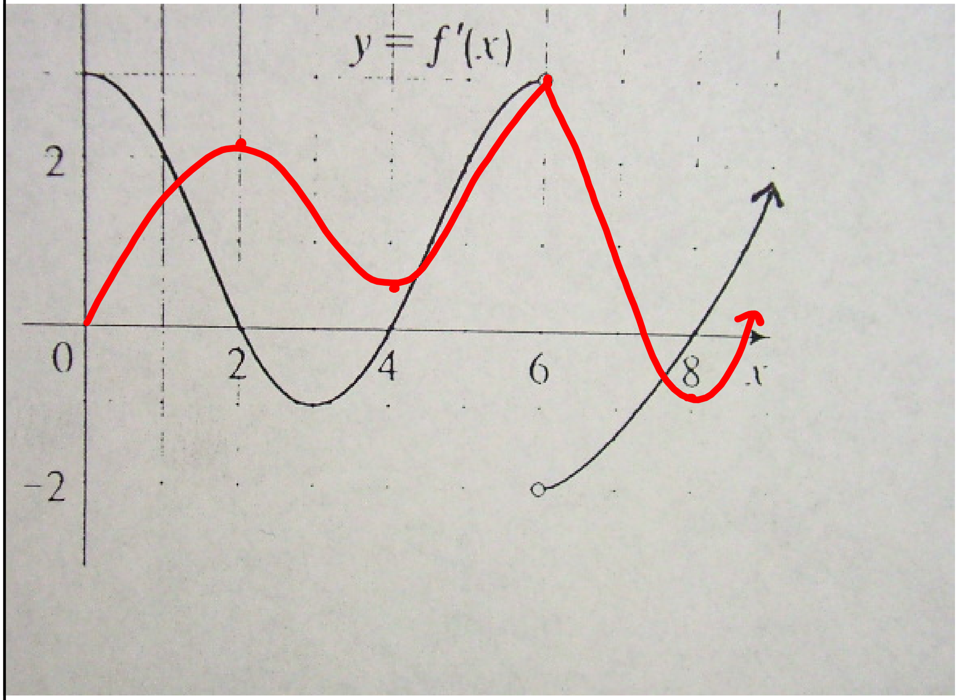
Use the 1st Derivative Test to analyze the function.



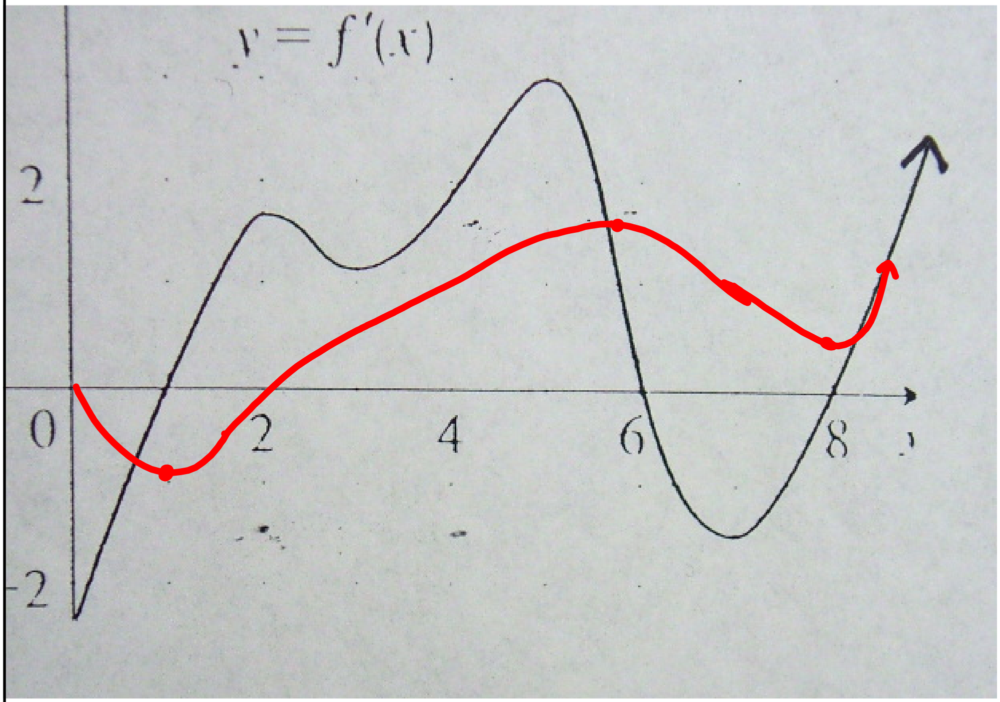
Use the 1st Derivative Test to analyze the function.



Use the 1st Derivative Test to analyze the function. #25



Use the 1st Derivative Test to analyze the function.



Find all numbers *c* satisfying the MVT. Describe the meaning of this value.

$f(x) = x^3 - x^2 - x + 1; [-1, 2]$ continuous $[-1,2]$ ✓

$f'(x) = 3x^2 - 2x - 1$ differentiable $(-1,2)$ ✓

$f(b) - f(a) = (b - a) f'(c)$

$f(2) - f(-1) = (2+1)(3c^2 - 2c - 1)$

$3 - 0 = 3(3c^2 - 2c - 1)$

$3 = 3(3c^2 - 2c - 1)$

$1 = 3c^2 - 2c - 1$

$0 = 3c^2 - 2c - 2$

$C = \frac{2 \pm \sqrt{4 - 4(3)(-2)}}{2(3)}$

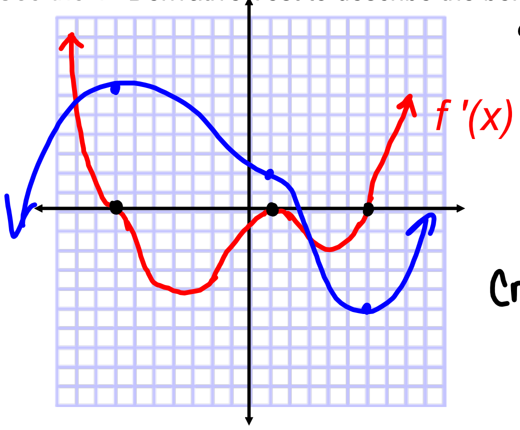
$C = \frac{2 \pm \sqrt{4 + 24}}{6}$

$= \frac{2 \pm \sqrt{28}}{6} = \frac{2 \pm 2\sqrt{7}}{6}$

$C = \frac{1+\sqrt{7}}{3}, \frac{1-\sqrt{7}}{3}$

∴ Since f(x) is continuous on [-1,2] and differentiable on (-1,2), the tangent lines to $f(x) = x^3 - x^2 - x - 1$ through the points $c = {}^{1+\sqrt{7}}/_3$ and $c = {}^{1-\sqrt{7}}/_3$ will be parallel to the secant line to $f(x) = x^3 - x^2 - x - 1$ through x = -1 and x = 2. In other words, the instantaneous rate of change at $c = {}^{1+\sqrt{7}}/_3$ and $c = {}^{1-\sqrt{7}}/_3$ will be the same as the average rate of change between x = -1 and x = 2.

Use the 1[st] Derivative Test to describe the behavior of the function.



$D_{f(x)}: \mathbb{R}$

$D_{f'(x)}: \mathbb{R}$

Critical #s:

$x = -7, 1, 6$

Domain Interval	f'(x)	f(x)	
$(-\infty, -7)$	+	increasing	
			> max @ x = -7
$(-7, 1)$	−	decreasing	
			> glitch @ x = 1
$(1, 6)$	−	decreasing	
			> min @ x = 6
$(6, \infty)$	+	increasing	

Assignment:

1st Derivative Test

#1-6

* Choose one to write the therefore statement *

* QUIZ on MVT and 1st Derivative Test *

Derivatives:

1) $f'(x) = \dfrac{1}{2(x+1)^{\frac{1}{2}}}$

2) $f'(x) = \dfrac{1}{6}x(3x-4)$

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

4) $f'(x) = x(x+1)(x-1)$

5) $f'(x) = -\dfrac{1}{2}x\left(x+\sqrt{2}\right)\left(x-\sqrt{2}\right)$

6) $f'(x) = 2(3x+1)(x-1)$