

Circuit Training – Mean Value Theorem

Name _____

In each case with no additional directions, verify that the function satisfies the hypotheses of the Mean Value Theorem on the given interval. Then, find all numbers c that satisfy the conclusion of the Mean Value Theorem. Only use a calculator where you see the icon. Begin in cell #1, work the problem, search for your answer(s), call that cell #2 and proceed in this manner until you complete the circuit.

# ____1____	Answer: $\frac{3}{5}$
$y = x^2 - 4x + 7, \quad [-4, 1]$	
# _____	Answer: -12
Where on the interval $[0, \pi]$ is the secant line parallel to the tangent line for $y = x \sin x$?	
	
# _____	Answer: $-\frac{3}{2}$
$y = \frac{1}{3}x^3, \quad [-3, 3]$	
# _____	Answer: $\pm \frac{4}{\sqrt{3}}$
$y = x\sqrt{x+5}, \quad [-5, 0]$	

Answer: $e - 1$

$$y = \sin(2x) , \quad \left[0, \frac{\pi}{2}\right]$$

Answer: $\pm\sqrt{3}$

$$y = \sqrt{x-1} , \quad [1, 10]$$

Answer: 3.433

The function $g(x)$ is continuous on the closed interval $[8, 10]$ and differentiable on the open interval $(8, 10)$. The value $x = 8.5$ satisfies the conditions of the Mean Value Theorem on the interval $[8, 10]$. What is $g(10)$ given $g'(8.5) = -9$ and $g(8) = 6$?

Answer: $\frac{13}{4}$

$$y = -x^3 + 3x , \quad [-4, 4]$$

Answer: $-2 + \sqrt{3}$

$$y = \frac{1}{x+2}, \quad [-3, -1]$$

Answer: $\frac{\pi}{4}$

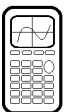
$$y = 2e^x, \quad [0, \ln 5]$$

Answer: 2.029

$$y = \begin{cases} x^2, & x \leq 1 \\ 2x - 1, & x > 1 \end{cases} \quad [-1, 4]$$

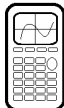
Answer: $-\frac{10}{3}$

$$y = \sqrt[3]{(2x-3)^2}, \quad \left[\frac{3}{2}, \frac{11}{2}\right]$$



Answer: Mean Value Theorem does not apply since the function is not differentiable on the given interval.

The position of a toy car moving back and forth along a horizontal track is modeled by the equation $x(t) = -\frac{2}{3}t^3 - \frac{1}{2}t^2 + 10$ for $t \geq 0$. Determine when the instantaneous velocity of the toy car is the same as the average velocity of the toy car on the closed interval $[0, 6]$.



Answer: Mean Value Theorem does not apply since the function is not continuous on the given interval.

$$y = \ln x, \quad [1, e]$$

Answer: $\ln\left(\frac{4}{\ln 5}\right)$

$$y = |3x + 6|, \quad [-4, 0]$$

Answer: 2.685

$$y = \frac{1}{x+2}, \quad [-1, 1]$$