# 4 2 Mean Value Theorem Chaoticgolf

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### 4 2 Mean Value Theorem

**4.2 Mean Value Theorem - Iowa State University**
42 Mean Value Theorem Theorem (Rolle's Theorem) If f(x) is a function on the interval a x b where a < b and the following holds: f(a) = f(b), f is continuous for a x b, and f is di erentiable for a < x < b, then there is at least one c where a < c < b and f0(c) = 0 Proof MATH 165 Section 42 March 11, 2019 1 / 8

**4.2 Mean Value Theorem - McLean County Unit District No. 5**
AP Calculus BC 42 Mean Value Theorem Objective: able to apply the Mean Value Theorem & find the intervals on which a function is increasing or decreasing For each graph, draw the secant line through the endpoints of the interval, then draw any tangent lines that are parallel to this secant line

**SECTION 4.2: THE MEAN VALUE THEOREM - GitHub Pages**
4Suppose a car is traveling down the road and in 30 minutes it travels 327 miles What does the Mean Value Theorem have to say about this? 5Suppose that f(0) = 3 and that f0(x) exists and is less than or equal to 5 for all values of x How large can f(2) possibly be? 6(a)Suppose f(x) = C …

**4.2 Mean Value Theorem - Mr. Abbott's Mathematics and ...**
Section 42 Mean Value Theorem 199 Proof Let x 1 and x 2 be any two points in a, b with x 1 x 2 The Mean Value Theorem applied to f on x 1, x 2 gives f x 2 f x 1 f c x 2 x 1 for some c between x 1 and x 2 The sign of the right-hand side of this equation is the same as the sign of f c because x 2 …

**4.2 MEAN VALUE THEOREM - scotthighskyhawks.com**
42 Mean Value Theorem Calculus Example: [2004 AP Calculus AB Free Response Question #3 …Calculator Allowed] A particle moves along the y-axis so that its velocity at time t > 0 is given by vt e()=−1tan−1 ()tAt time t = 0, the particle is at y = –1 (Note: tan arctan−1 x = x) a) Find the acceleration of the particle at time t = 2 b) Is the speed of the particle increasing or

**4.2 Mean Value Theorem - Ms. Neacs' Website**

MEAN VALUE THEOREM Let f be differentiable on (a ,b) and continuous on [a, b] There is at least one point c in (a, b) where f c′ ( ) = f(b)− f(a) b− a (geometrically obvious) ex: Let f x( ) = x 3 +1 Show that f(x) satisfies the hypotheses of the Mean Value Theorem on the interval [1,2] and find all values c in this interval whose existence is guaranteed by the theorem

**Section 4.2 The Mean Value Theorem**

Use the Mean Value Theorem to prove the inequality jsina sinbj ja bj for all a and b Solution: 318 ¤ CHAPTER4APPLICATIONS OF DIFFERENTIATION 26 ,I3 $ i 0( {) $ 5 IRU DOO WKHQ E\ WKH 0HDQ 9DOXH 7KHRUHP i(8) 3 (2) = 0( f) ·(8 3 2) IRU VRPHLQ[2>8] i LV GLIIHUHQWLDEOH IRU DOO{ VR LQ SDUWLFXODU i LV GLIIHUHQWLDEOH RQ(2 >8) DQG FRQWLQXRXV RQ[2>8

**Section 4.2 Notes Page 1 4.2 The Mean Value Theorem**

Section 42 Notes Page 1 42 The Mean Value Theorem Consider the following graph If a graph goes through f a ( ) and f b ( ) then it must change directions If it changes directions then the derivative must be zero since this is a maximum This idea has a name: Rolle’s Theorem

**Chapter 4. Applications of Derivatives 4.2. The Mean Value ...**

42 The Mean Value Theorem 2 Example Exercise 4260 Note We now state the Mean Value Theorem First, the “mean” part means (!) “average” Informally, the Mean Value Theorem says that for a differentiable function on an interval [a,b], the average rate of change equals the instantaneous rate of change at some point between a and b

**04 - Mean Value Theorem**

Mean Value Theorem Date_____ Period____ For each problem, find the values of c that satisfy the Mean Value Theorem 1) y = −x2 + 8x − 17 ; [ 3, 6] x y −8 −6 −4 −2 2 4 6 8 −8 −6 −4 −2 2 4 6 8 {9 **2**} 2) y = x3 − 9x2 + 24 x − 18 ; [ 2, 4] x y −8 −6 −4 −2 2 4 6 8 −8 −6 −4 −2 2 4 6 8 {9 + 3 3, 9 − 3 3} 3) y

**AP Calculus AB Mean Value Theorem (MVT) Unit 4 Packet B**

AP Calculus AB Mean Value Theorem (MVT) Unit 4 Packet B 2 [1 1 ( ) x f x]on the interval 3 [1 1 ( ) x h x on the interval ] 4 ]on the interval [ [ ]5 on the interval EXAMPLE 1: If the function is defined on [ ] by , show that the Mean Value Theorem can be applied to and …

**4.2 The Mean Value Theorem**

The Mean Value Theorem, which was first stated by Joseph-Louis Lagrange, is a slanted version of Rolle’s Theorem (Figure 414) There is a point where the tangent is parallel to chord AB y = 1 y = ƒsxd x =-1 y =-3 x = 0 x = c ƒ¿ x = b x = a x y 0 1 (1, 5) 1 (–1, –3) –1 y 3x 3x 1 FIGURE 413 The only real zero of the polynomial is

**The Mean Value Theorem**

Since −3 ≤ f ′(x) ≤ 2 for all x, by the Mean Value Theorem the average rate of change of f on any interval has to be bounded between −3 and 2 as well Therefore, on the interval [4, 10], which has a length of 6, the values of f can change between −18 (if the average rate of change

**Calculus 140, section 4.2 The Mean Value Theorem**

Calculus 140, section 42 The Mean Value Theorem notes by Tim Pilachowski We begin with Rolle’s Theorem [Theorem 44] (named for Michel Rolle): “Let f be continuous on [a, b] and differentiable on (a, b)If f (a) = f(b), then there is a number c in (a, b) such that f ′(c)= 0”If f is a constant function, then f ′(x)= 0 for all values in (a, b)

**4.6: Mean Value Theorem**

2:5 ˇ68 mph By the Mean Value Theorem, Heidis instantaneous speed was 68 mph at some point of her trip: hence, she broke the 65 mph speed limit

Problem 4 Does the function given in the graph below satisfy the hypotheses of the Mean Value Theorem in the interval [ 1;6]? If so, estimate the values of all numbers c that satisfy the conclusion

**4.2 The Mean Value Theorem - Home | UCI Mathematics**

42 The Mean Value Theorem The Mean Value Theorem is one of the most important results in calculus We prove it as a conse-quence of a slightly simpler result Theorem (Rolle) Suppose that f is continuous on a closed interval [a,b], differentiable on (a,b), and that f(a) = f(b) = 0 Then there exists some c 2(a,b) for which f0(c) = 0

**The Mean Value Theorem**

Section 43 The Mean Value Theorem (1)Rolle's Theorem and the Mean Value Theorem (2)The First Derivative Test Rolle's Theorem Supposethatf isafunctionsuchthat (I) f iscontinuouson[a,b], (II) f isdifferentiableon(a,b),

**Lecture 16 :The Mean Value Theorem Rolle's Theorem**

Sometimes we can nd a value of c that satis es the conditions of the mean Value Theorem Example Let f(x) = x3 + 2x2 x 1, nd all numbers c that satisfy the conditions of the Mean Value Theorem in the interval [ 1;2] f is continuous on the closed interval [ 1;2] and di erentiable on the open interval ( 1;2) Therefore the Mean Value theorem

**Mean Value Theorem & Rolle's Theorem**

Thus, the Mean Value Theorem does not apply 2 5 Consider f(x) = x3 x2 (a) Find the value(s) of cwhich satisfy the conclusion of the Mean Value Theorem on [ 4;4] c= 2 or c= 8 3 (b) At each value of cfound in part (a), calculate an equation of the line which is tangent to the graph of f(x)