Mean Value Theorem

Numberbender | WORKSHEET

Name: _____ Date: _____ Score: _____

Determine whether the MVT hypothesis is satisfied; if so, find c. Show all work.

AB Calculus
Worksheet #31

For #1 – 12, determine whether the hypothesis of the Mean Value Theorem or Rolle's Theorem is satisfied. If it is, find c. If not, tell why not.

1. $f(x)=x^2-2x-3$ on [-1,3]	2. $f(x)=x^3-x$ on [0,1]
3. $f(x)=\dfrac{x^2-x-6}{x-1}$ on [-2,3]	4. $f(x)=\sin x$ on $[0,\pi]$
5. $f(x)=\tan x$ on $[0,\pi]$	6. $f(x)=x^2-2x+1$ on [1,3]
7. $f(x)=4-x^2$ on [1,4]	8. $f(x)=x^2-7x$ on [1,5]
9. $f(x)=3x^2-5x+1$ on [2,5]	10. $f(x)=x^{\frac{3}{4}}$ on [0,16]
11. $f(x)=\sqrt{1-x^2}$ on [-1,1]	12. $f(x)=\dfrac{1}{x^2}$ on [-1,1]
13. $f(x)=\dfrac{1-\cos x}{x}$ when $x\neq 0$ and f(0)=k. Find k so that f is continuous at x=0.	
14. $f(x)=\dfrac{x^3-1}{x-1}$ when $x\neq 0$, and f(1)=k. Find k so that f is continuous at x=1.	
15. $f(x)=\begin{cases}\dfrac{x^3+8}{x+2} & \text{when } x\neq -2\\ k & \text{when } x=-2\end{cases}$ Find k so that f is continuous at x=-2.	
16. $\int \sin^3 4x\,dx$	
17. $\int \sin^2 4x\,dx$	
18. $\int \dfrac{1}{2^x}dx$	

Mean Value Theorem

Numberbender | ANSWER KEY

Answer key — for instructor use only.

Answers:

1. c = 1	2. $c = \frac{\sqrt{3}}{3}$	3. Doesn't satisfy MVT because f(x) is discontinuous at x = 1	4. $c = \frac{\pi}{2}$
5. Doesn't satisfy MVT because f(x) is discontinuous at $x = \frac{\pi}{2}$	6. c = 2	7. $c = \frac{5}{2}$	8. c = 3
9. $c = \frac{7}{2}$	10. $c = \frac{81}{16}$	11. c = 0	12. Doesn't satisfy MVT because f(x) is discontinuous at x = 0
13. k = 0	14. k = 3	15. k = 12	16. $\frac{-1}{4}\cos 4x + \frac{1}{12}\cos^3 4x + C$
17. $\frac{1}{2}x - \frac{1}{16}\sin 8x + C$	18. $\frac{-2^{-x}}{\ln 2} + C$		