In The Name Of Allah

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MATH-101 Term-131 IN-Class-QUIZ-13

KEY

(show all your work and circle one letter to get a full mark or you will get zero)

1) The sum of all values that satisfying the conclusion of Rolle's Theorem for $f(x) = x - \frac{1}{\pi}\cos(\pi x)$ on the interval [0, 4] is

(a) 5/2
(b) 3/2
(c) 7/2
(d) 0
(e) 10
(f) none of the above ✓

$f'(x) = 1 + \frac{1}{\pi}\sin(\pi x)(\pi)$

$1 + \sin(\pi x) = 0$

$\sin(\pi x) = -1$

$x_1 = 3/2, \quad x_2 = 7/2$ not the domain

$x_1 + x_2 = 3/2 + 7/2 = 5$ ✓

proof

$P = \frac{2\pi}{\pi} = 2$

80/80

2) The sum of all values that satisfying the conclusion of the Mean Value Theorem for the function $f(x) = x^2$ on the interval [2, 5] is

$f(a) = 4 \quad f(b) = 25 \quad b - a = 3$

$f'(x) = 2x$

(a) 5/2
(b) 7/2
(c) 9/2
(d) 3
(e) 4
(f) none of the above

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

$\frac{25 - 4}{3} = c$

$7 = 2c$

$c = 7/2$ ✓

3) Let f be a differentiable function such that $2 < f'(x) < 6$ for all values of x, then which one of the following statement is TRUE?

(a) $6 < f(7) - f(5) < 12$
(b) $4 < f(7) - f(5) < 6$
(c) $2 < f(7) - f(5) < 6$
(d) $10 < f(7) - f(5) < 14$
(e) $4 < f(7) - f(5) < 12$ ✓
(f) none of the above

$2 < \frac{f(b) - f(a)}{b - a} < 6$

$2 < \frac{f(7) - f(5)}{7 - 5} < 6$

$2 < \frac{f(7) - f(5)}{2} < 6$

$4 < f(7) - f(5) < 12$ ✓