Calculus Name_____

MVTI; Average Value of a Function

For each problem, find the values of *c* that satisfy the Mean Value Theorem for Integrals.

1) $f(x) = 2x^2 - 4x - 4;\ [0, 3]$

For each problem, find the average value of the function over the given interval.

2) $f(x) = -x^2 + 2x + 1;\ [1, 4]$

For each problem, find the average value of the function over the given interval. Then, find the values of *c* that satisfy the Mean Value Theorem for Integrals.

3) $f(x) = -2x^2 - 8x - 8;\ [-3, -2]$

4) $f(x) = -\dfrac{3}{(x+1)^2};\ [-6, -3]$

For each problem, find the average value of the function over the given interval.

5) $f(x) = 3e^{x}$; $[-1, 0]$

6) $f(x) = -2e^{2x+4}$; $[-3, -2]$

7) $f(x) = \csc^2 x$; $[\frac{\pi}{2}, \frac{3\pi}{4}]$

8) $f(x) = 2\sin x$; $[-\frac{\pi}{3}, \frac{\pi}{4}]$

9) $f(x)$, $f(x) = \begin{cases} -x^2 - 6x - 8, & x < -3 \\ -\frac{x}{2} - \frac{1}{2}, & x \geq -3 \end{cases}$; $[-4, 3]$

10) $f(x)$, $f(x) = \begin{cases} -1, & x < 1 \\ -x^2 + 4x - 4, & x \geq 1 \end{cases}$; $[0, 3]$

11) $f(x) = 5(2x + 2)^{\frac{1}{2}}$; $[-1, 0]$

12) $f(x) = -\frac{5}{2x - 4}$; $[3, 6]$

Answers to MVTI; Average Value of a Function

1) 0, 2

2) -1

3) Average value of function: $-\frac{2}{3} \approx -0.667$

Values that satisfy MVT: $\frac{-6-\sqrt{3}}{3} \approx -2.577$

4) Average value of function: $-\frac{3}{10} = -0.3$

Values that satisfy MVT: $-1-\sqrt{10} \approx -4.162$

5) $\frac{3e-3}{e} \approx 1.896$

6) $\frac{-e^2+1}{e^2} \approx -0.865$

7) $\frac{4}{\pi} \approx 1.273$

8) $\frac{-12\sqrt{2}+12}{7\pi} \approx -0.226$

9) $-\frac{1}{3} \approx -0.333$

10) $-\frac{5}{9} \approx -0.556$

11) $\frac{10\sqrt{2}}{3} \approx 4.714$

12) $\frac{-5\ln 8 + 5\ln 2}{6} \approx -1.155$