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Instructions: Though calculators can be used for the entire daily question, all problems require you to show your work. Any answer without proper justification will receive **_ZERO_** credit. Only **_EXACT_** answers will receive full credit unless otherwise noted.

1. State the Mean Value Theorem (MVT).

If $f(x)$ is continuous on the interval $[a,b]$, and $f(x)$ is differentiable on the interval (a,b), then there exists at least one point c in the interval (a,b) such that

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

2. Determine all values of x that satisfy the MVT for $f(x) = x^3 - x$ on $[0, 2]$

$f'(x) = 3x^2 - 1$

$f(x)$ cont $[0,2]$ ✓
$f(x)$ deff $(0,2)$ ✓

$2^3 - 2$
$8 - 2$
6

$$\frac{f(2) - f(0)}{2 - 0} = \frac{6 - 0}{2} = \frac{6}{2} = 3$$

$3 = 3x^2 - 1$
$4 = 3x^2$
$4/3 = x^2$

$\pm \sqrt{4/3} = x$

$(0,2)$

$x = \sqrt{4/3}$

$x = \sqrt{4/3}$ satisfies the MVT for $f(x) = x^3 - x$ on the interval $[0,2]$.