Warm-Up After MVT

Determine if the MVT applies to the given interval if not, explain why if so, find the value of x that satisfies the MVT without a calculator.

1. $f(x)=|x-1|$ **on** $[-3,5]$

2. $f(x)=|x-1|$ **on** $[-3,1]$

3. $f(x)=x^2$ **on** $(0,2]$

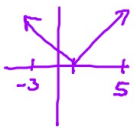
4. $f(x)=\ln(x+3)$ **on** $[-2,2]$

5. $f(x)=x^{\frac{2}{3}}$ **on** $[-2,2]$

Warm-Up After MVT

Determine if the MVT applies to the given interval if not, explain why if so, find the value of x that satisfies the MVT without a calculator.

1. $f(x)=|x-1|$ **on** $[-3,5]$ $\quad f'(x)=\begin{cases}-1 & x<1\\ 1 & x>1\end{cases}$



MVT does not apply b/c $f(x)$ is not diff. @ $x=1$

2. $f(x)=|x-1|$ **on** $[-3,1]$

$$\frac{|1-1|-|-3-1|}{1-(-3)}=-1$$

$$\frac{-4}{4}=-1$$

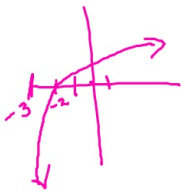
$$-1=-1$$

all x values on the interval $[-3,1)$

3. $f(x)=x^2$ **on** $(0,2]$

MVT d.n. apply on a open interval

4. $f(x)=\ln(x+3)$ **on** $[-2,2]$



$$\frac{\ln(2+3)-\ln(-2+3)}{2-(-2)}=\frac{1}{x+3}$$

$$\frac{\ln(5)}{4}=\frac{1}{x+3}$$

$$x+3=\frac{4}{\ln(5)}$$

$$x=\frac{4}{\ln(5)}-3$$

5. $f(x)=x^{\frac{2}{3}}$ **on** $[-2,2]$

$f'(x)=\frac{2}{3}x^{-\frac{1}{3}}=\frac{2}{3x^{1/3}}$

MVT d.n. apply f is not diff. @ $x=0$.