AP Calculus AB

You may only use your calculator for computations,
***do not* use the graphing capabilities.**

Given the function $f(x)=\left(x^2-9\right)^{\frac{1}{3}}$ on the Closed Interval $[-6,6]$.

1. Evaluate $f(-4)$ and $f(-1)$. What can you conclude? Justify your answer.

2. Locate the absolute extrema of the function on the closed interval.
   List all critical values used.

3. Determine whether Rolle's Theorem can be applied. If it can be applied, find all values of *c* in the open interval (a,b) such that $f'(c)=0$.

4. Determine whether the Mean Value Theorem can be applied. If it can be applied, find all values of *c* in the open interval (a,b) such that $f'(c)=\dfrac{f(b)-f(a)}{b-a}$.

5. What did you notice about your answers in # 3 and #4?

6. a) What does it mean when the derivative is negative about the original function?

   b) What does it mean when the derivative is positive about the original function?

7. Evaluate the 1st derivative on the following intervals.

Interval	$(-6,-3)$	$(-3,0)$	$(0,3)$	$(3,6)$
Test Value				
Sign of $f'(x)$				
Conclusion for $f(x)$				

8. Draw a graph of the function $f(x)=\left(x^2-9\right)^{\frac{1}{3}}$ on the Closed Interval $[-6,6]$.

You may use your calculator on the following problems, but please show your work.

Given the function $f(x) = 3x^{2/3} - 2x$ on the interval $[-2, 2]$

1. Is the Mean Value Theorem and / or Rolle's Theorem applicable?
   If so, show your work. If not explain why.

2. Is there any places on the interval $[-2, 2]$ where the derivative is horizontal?

3. Using the first derivative test, find the intervals where the function is increasing or decreasing.

4. Using the second derivative test, find the intervals where the function is concave up or concave down.

5. Copy the graph of $f(x)$ from your calculator and identify all max's, min's and P.O.I.