Quiz #5a Math 101 Semester 042

Name:	I.D.		

Q27/5.3 Consider the function $f(x) = x^{\frac{1}{3}}(5-x)$ Follow the steps to sketch the Graph of the function.

1) Find symmetry if any

No

2) Find y-int. then x-int. then check if the graph above the x-axis or below.

$(0,0)$ $(0,5)$

f: $-$ 0 $+$ 5 $-$

3) Find critical points then check if the graph increasing or decreasing , then find relative extreme

$f'(x) = \frac{1}{3}x^{-2/3}(5-x) - x^{1/3}$

$= \frac{5}{3}x^{-2/3} - \frac{1}{3}x^{1/3} - x^{1/3}$

$= \frac{5}{3}x^{-2/3} - \frac{4}{3}x^{1/3} = \frac{x^{-2/3}}{3}(5-4x)$

f': ↗ 0 ↗ 5/4 ↘

4) Find asymptotes if any

No

5) Check if the graph concave up or down then find inflection points if any

$f''(x) = -\frac{10}{9}x^{-5/3} - \frac{4}{9}x^{-2/3}$

$= -\frac{2}{9}x^{-5/3}(5+2x)$

f'': $\cap$ $-5/2$ $\cup$ 0 $\cap$

6) Check the behavior of the graph as $x \to \infty$ and $x \to -\infty$

$\lim_{x\to\infty} f(x) = -\infty = \lim_{x\to-\infty} f(x)$

7) Is there a cusp or a vertical tangent

8) Find the absolute extremum in the [0,2]

9) Sketch the graph

(7) vertical tangent at $x=0$

Since $\lim_{x\to 0^-} f'(x) = \infty = \lim_{x\to 0^+} f'(x)$

(8)

x	$f(x)$
0	Abs min
5/4	Abs max
2