

IN THIS STEP WE FIND THE CONCAVITY OF THE GRAPH.

=====

HERE WE FIND THE INFLECTION POINTS AND WHERE THE GRAPH CONCAVES UP AND DOWN.

-TO FIND THE INFLECTION POINTS OF THE GRAPH WE NEED TO SOLVE FOR

$$f(x)'' = 0;$$

-NEXT WE FIND WHERE THE GRAPH IS CONCAVE UP AND DOWN ---->

-IF THE $f(x)'' > 0$ THEN THERE IS A CONCAVE UP

-IF THE $f(x)'' < 0$ THEN THERE IS A CONCAVE DOWN

$$\begin{aligned} f'''(x) &= \frac{5}{3} [(-1)(5-x)^{-1/3} + (3-x)(-1/3)(5-x)^{-4/3}(-1)] \\ &= \frac{5}{3} \left[-\frac{3}{3}(5-x)^{-1/3}(5-x)^{-4/3}(5-x)^{4/3} + \frac{1}{3}(3-x)(5-x)^{-4/3} \right] \\ &= \frac{5}{3} \frac{5-3(5-x)+(3-x)}{3(5-x)^{4/3}} = \frac{5}{3} \frac{2x-12}{3(5-x)^{4/3}} = \frac{10(x-6)}{9(5-x)^{4/3}} \end{aligned}$$

$$f'''(x) = 0 \text{ at } x = 6, \quad f(6) = 6(5-6)^{2/3} = 6$$

x		5		6	
$f(x)$	\cap	0	\cap	6	\cup
$f''(x)$	-	DNE	-	0	+

(6,6) is a point of inflection.