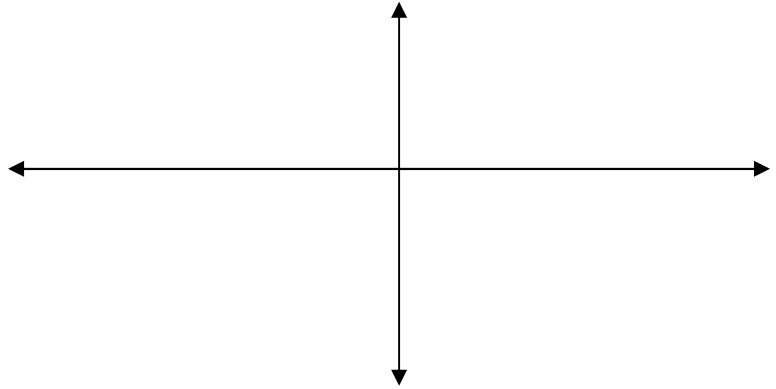Sketch the function below using techniques developed in <u>Advanced Functions</u>. What <u>key</u> points can you calculate? What <u>key</u> points are you missing to make your sketches more detailed?

$y = x^3 - 9x^2 + 24x - 16$

To help find those key points, we can use concepts that we developed through previous activities:

> <u>IDEAS</u>
> ▶ Connections between 1st and 2nd differences and the missing key points in a table or in a graph
> ▶ What do you know about IROC at these key points?

1. Determine a small interval that you know MUST contain the maximum. What is that interval?

    Interval: _____

2. Make your best guess of the location of the maximum. Use IROC to judge your guess. What are you expecting IROC to be?

$x =$ _____

3. Use your results from above to make one more guess and use IROC to assess your choice. This time, do not choose a value for h. Keep h in your calculation until the very end. When is h allowed to be 0?

$x =$ _____

$$IROC = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$= \lim_{h \to 0} \frac{f(\quad + h) - f(\quad)}{h}$$

Practice: Sketch each of the following. Predict the location of a turning point and assess you prediction by calculating the IROC.

Set A	$y = 2x^3 - x^2 - 18x + 9$	$y = \dfrac{x}{(x+2)(x+3)}$
Set B	$y = 2x^3 + x^2 - 8x - 4$	$y = \dfrac{-(x-1)}{(x+2)^2}$