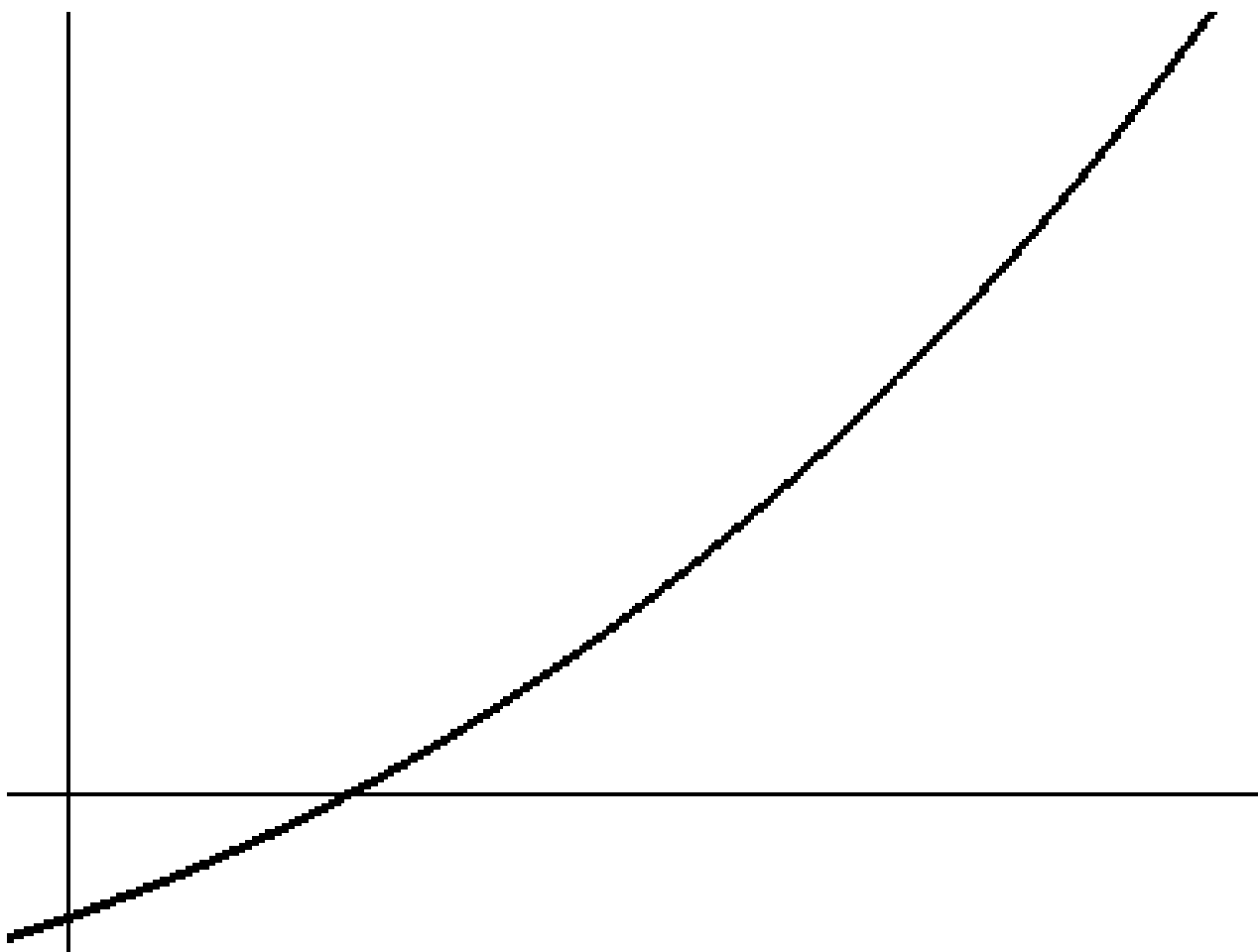Newton's Method Graphs

Part I:  Given the attached graph of a function $y = f(x)$.

1. Indicate the point that is the root of the equation.  Label it $r$.

2. Start at the x-value labeled $x_0$, and draw a vertical line to the graph.  Mark the point on the graph $(x_0, f(x_0))$.

3. Draw the tangent line to the function at the point $(x_0, f(x_0))$

4. Indicate the point where the tangent line intersects the $x$-axis.  Label this point $x_1$

5. Repeat steps 2-4, starting with $x_1$, and labeling the new point $x_2$.  Continue this several times for $x_3$, $x_4$, etc.

6. What can you say about the points $x_1$, $x_2$, $x_3$, etc and their relationship to the root r.

Newton's Method Graphs

$$f(x) = x^3 + x^2 + x - 1$$