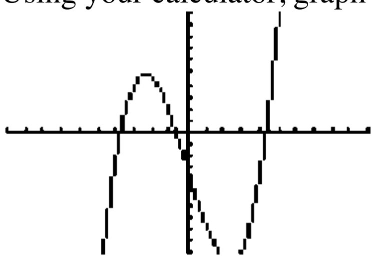
Intermediate Value Theorem
Let a and b be real numbers such that $a < b$. If f is a polynomial function such that $f(a) \neq f(b)$, then in the interval [a, b], f takes on every value between f(a) and f(b).

Example 1:
$f(x) = 0.3x^3 - 5x - 3$
Using a graphing utility, find all open intervals of length 1 that contain zeros of f(x).

Solution:
Using your calculator, graph the function.



Notice the x-intercepts are between -4 & -3, -1 & 0, 4 & 5

The intervals are: $\boxed{(-4, -3), (-1, 0), (4, 5)}$.

Example 2:
Find the zeros algebraically: $g(x) = 5x^2 - 10x - 5$

Solution:

Since g(x) cannot be factored, we use the quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

So we get: $x = \dfrac{10 \pm \sqrt{100 - 4(5)(-5)}}{10} = \dfrac{10 \pm \sqrt{100 + 100}}{10} = \dfrac{10 \pm \sqrt{200}}{10} = \dfrac{10 \pm \sqrt{2 \bullet 100}}{10}$
$= \dfrac{10 \pm 10\sqrt{2}}{10} = \boxed{1 \pm \sqrt{2}}$.

Example 3:
Find the zeros algebraically: $f(x) = x^5 - 6x^3 + 9x$

Solution:
Factor Completely: $f(x) = x(x^4 - 6x^2 + 9) = x(x^2 - 3)(x^2 - 3)$
Therefore: $x = 0, x^2 = 3$ So the zeros are at $\boxed{x = 0 \text{ and } \pm\sqrt{3}}$.

Assignment 112: Page 112, #'s 33-44 Odd, Also #'s 79-82 but Only do Part A