Find the zeros algebraically

1. $f(x) = 12x^3 + 26x^2 - 10x$

$= 2x(6x^2 + 13x - 5)$
$= 2x(3x - 1)(2x + 5)$

The Zeros are $x = 0, \frac{1}{3}, -\frac{5}{2}$

2. $f(x) = 15x^4 - 14x^2 - 8$

This example is not a Quadratic Function, but it is "Quadratic Like".
If we define $w = x^2$, we can rewrite the function in terms of w.

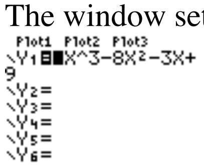
$f(w) = 15w^2 - 14w - 8$
$= (5w + 2)(3w - 4)$

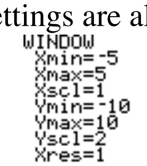
The Zeros in terms of w are $w = x^2 = -\frac{2}{5}, \frac{4}{3}$

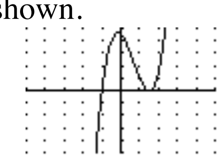
Finding the legal square roots of w, we get $x = \pm\frac{2}{\sqrt{3}} = \pm\frac{2\sqrt{3}}{3}$

3. $f(x) = 4x^3 - 8x^2 - 3x + 9$

Since Factoring is not immediately obvious, we will use the calculator to find one of the zeros.
The window settings are also shown.







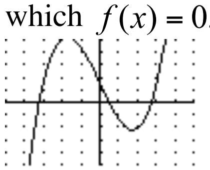
From the graph it appears that -1 is a zero. Therefore (x + 1) is a factor.

So we do a division: $(4x^3 - 8x^2 - 3x + 9) \div (x + 1) = 4x^2 - 12x + 9$

So far we have: $(4x^3 - 8x^2 - 3x + 9) = (x + 1)(4x^2 - 12x + 9) = (x + 1)(2x - 3)^2$

The Zeros are $x = -1, \frac{3}{2}$. The $\frac{3}{2}$ has multiplicity two.

4 Use the Intermediate Value Theorem and a graphing utility to find graphically any intervals of length 1 in which $f(x) = 0.7x^2 - 6.4x + 3$ is guaranteed to have a zero.



From the graph there are several answers to choose from. They are [-4, -3] or [0, 1] or [2, 3], because, for instance f(-4) < 0 and f(-3) > 0, so there is a zero between -4 and -3 by the IVT (Intermediate Value Theorem).

Pre-Calculus 1 Assignment 113 Wednesday, September 30, 2015 Hour Name

02.02 Polynomial Functions of Higher Degree

Exer. 1-6: Find the zeros algebraically.

1.	$g(x) = 5x^2 - 10x - 5$
2.	$y = \frac{1}{4}x^3(x^2 - 9)$
3.	$g(t) = t^5 - 6t^3 + 9t$
4.	$f(x) = 5x^4 + 15x^2 + 10$
5.	$y = 4x^3 + 4x^2 - 7x + 2$
6.	$y = x^5 - 5x^3 + 4x$

Exer. 7-10: Use the Intermediate Value Theorem and a graphing utility to find graphically any intervals of length 1 in which the polynomial function is guaranteed to have a zero.

7.	$f(x) = 1.22x^3 - 3x^2 + 1$
8.	$f(x) = 0.9x^2 + 4.5x - 3.4$
9.	$f(x) = x^3 - 4x + 1$
10.	$h(x) = -2x^3 - 6x + 3$