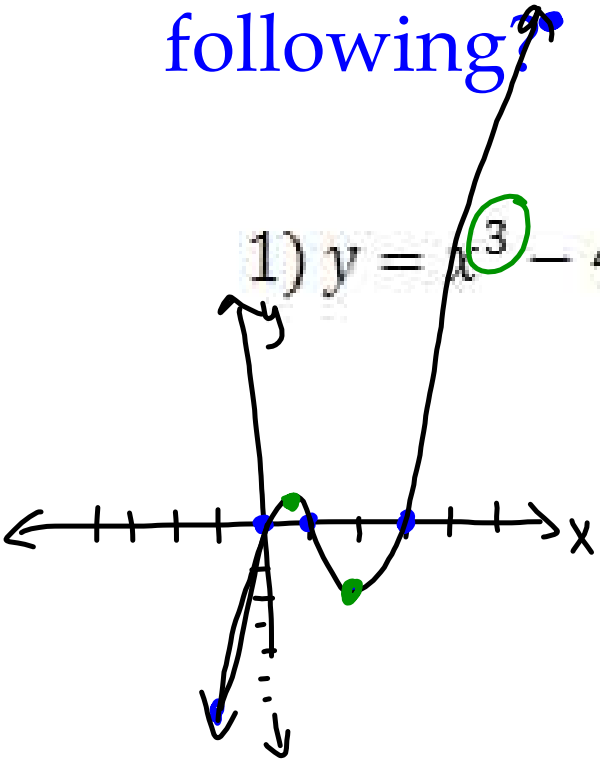
Can you Graph the following?

1) $y = x^3 - 4x^2 + 3x$



y-int

(0, ?)

$y = (0)^3 - 4(0)^2 + 3(0)$

$y = (3)^3 - 4(3)^2 + 3(3)$

$y = (2)^3 - 4(2)^2 + 3(2)$

$y = (5)^3 - 4(5)^2 + 3(5)$

$y = (1)^3 - 4(1)^2 + 3(1)$

$y = (-4)^3 - 4(-4)^2 + 3(-4)$

$y = (-1)^3 - 4(-1)^2 + 3(-1)$

Sketching Polynomials

What does the degree tell us?

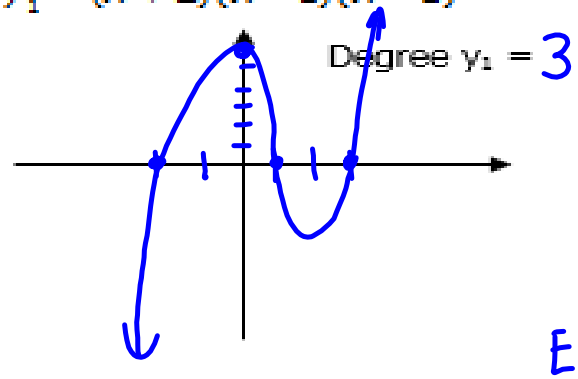
1. How many zeros (x intercepts) the graph will have.
2. End behavior + need leading coefficient to tell direction.
3. How many turns are in graph
   # of turns is degree minus one

A polynomial of degree n has at most n distinct real zeros and at most $n-1$ turning points.

Example: $f(x) = 4x^6 - 3x^3 + 8$ is of degree 6. It has at most 6 distinct real zeros and at most 5 turning points.

Examples:

$y_1 = (x+2)(x-1)(x-3)$



3 zeros

X = -2

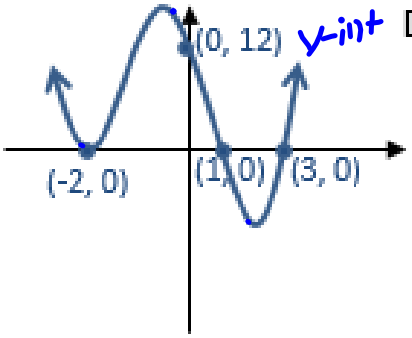
X = 1

X = 3

2 turns

E.B. opposite

$y_2 = (x+2)^2(x-1)(x-3)$



y-int

Degree $y_2 = 4$

4 zeros

$x = -2$

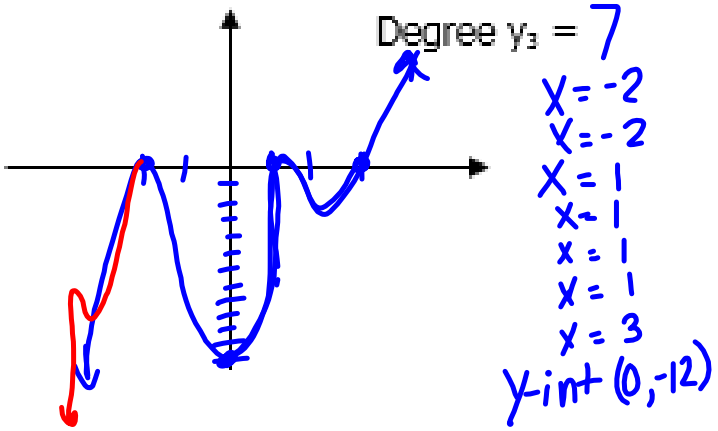
$x = -2$

$x = 1$

$x = 3$

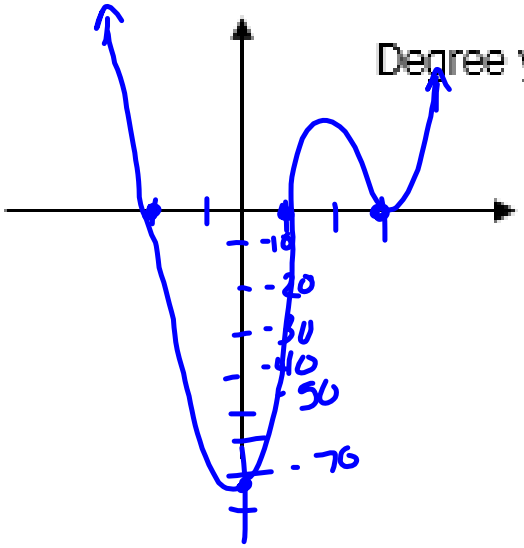
$(0+2)^2(0-1)^4(0-3)$

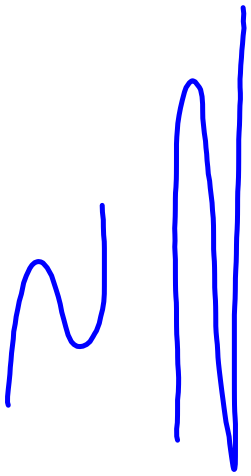
$y_3 = (x+2)^2(x-1)^4(x-3)$



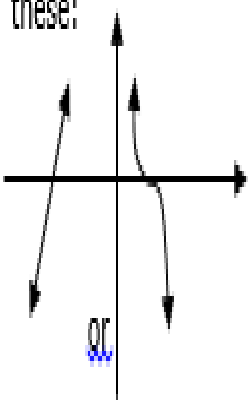
$y_4 = (x+2)^3(x-1)^5(x-3)^2$

Degree $y_4 =$ 10





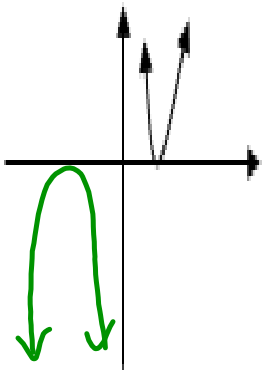
Under what circumstances did you find a "pass through" point? "Pass through would look like either of these:



multiplicity that is odd

(multiplicity is how many times a zero occurs).

Under what circumstances did you find a "bounce" point? By "bounce" we mean it looks like this:



multiplicity is even.

The degree of a factor of a polynomial is called the multiplicity of the factor. For each function y_1 through y_6, state each zero along with its multiplicity.

*Example: y_1: -2 has multiplicity 1, 1 has multiplicity 1, 3 has multiplicity 1.

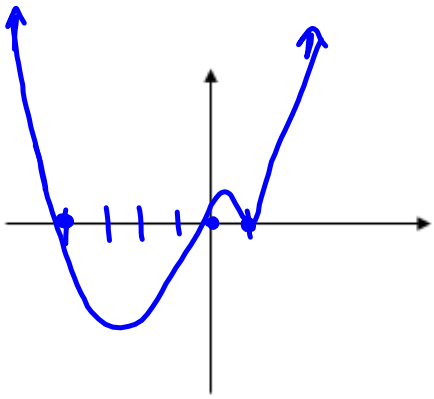
Y_2: -2 mult of 2, 1 mult. of 1, 3 mult. 1

Y_3: -2 mult. 2, 1 mult. 4, 3 mult. 1

Y_4: -2 mult. 3, 1 mult. 5, 3 mult. 2

Now you try:

1) $f(x) = x(x-1)^2(x+4)$



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

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