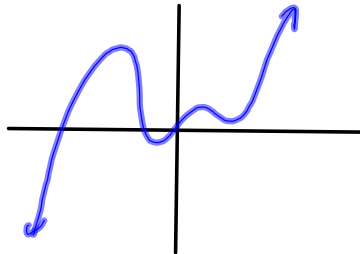


Graphs of Polynomial Functions

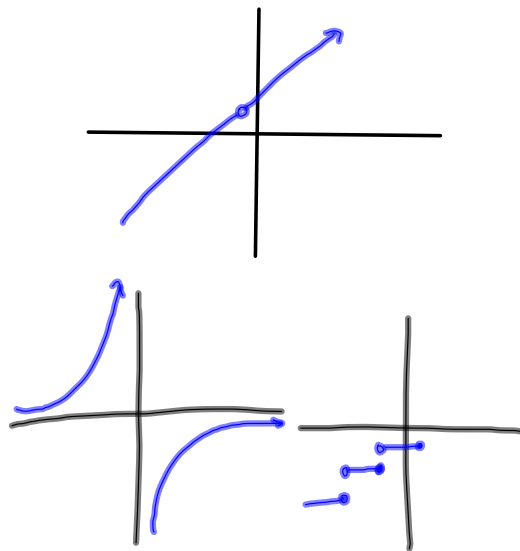
Continuous graph – is a graph that has not breaks, holes, or asymptotes.

Examples:

Continuous



Not Continuous



Oct 4 - 9:08 PM

Polynomial Functions – a function in the form:

$$a_n x^n + \dots + a_1 x^1 + a_0$$

Examples

$$y = \overset{a_2}{2}x^2 + \overset{a_1}{3}x - \overset{a_0}{10}$$

$$y = \frac{1}{2}x^2 + 4$$

$$y = 4x^5 - 3x^2 + 2x - \underset{\substack{\uparrow \\ a_0}}{10}$$

Not Polynomial

$$y = \frac{x-1}{x+3} \quad y = \sqrt{2x-3}$$

Oct 4 - 9:09 PM

Leading Coefficient Test

For any polynomial = $a_n x^n + \dots + a_1 x^1 + a_0$
 leading coefficient $y = 3x^4 + 6x - 10$

	$a_n = +$ $a_n > 0$	$a_n = -$ $a_n < 0$
$y = x^4 - 3x^3 + 2x + 1$ $n = \text{even}$ x^2, x^4, x^6, \dots highest degree	<p>$y = 3x^2$</p>	<p>$y = -3x^2$</p>
$n = \text{odd}$ x^3, x^5, x^7, \dots	<p>$y = 4x^3$</p>	<p>$y = -4x^3$</p>

Oct 4 - 9:09 PM

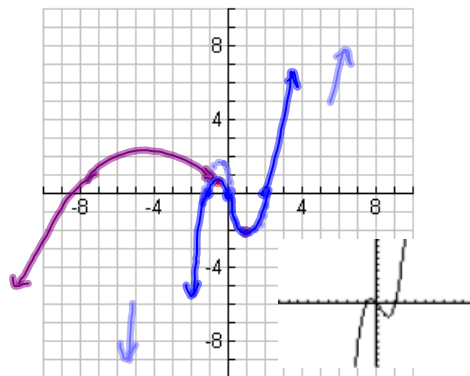
To graph a polynomial by hand:

1. identify the leading coefficient and identify the end behavior.
2. find the x and y intercepts
3. plot points between the zeros.
4. Sketch the graph

Graph $y = x^3 - x^2 - 2x$

xint
 $0 = x^3 - x^2 - 2x$
 $x(x^2 - x - 2)$
 $x(x+1)(x-2)$
 $x=0 \quad -1 \quad 2$

yint
 $y = 0^3 - 0^2 - 2 \cdot 0$
 $y = 0$



$\frac{1}{2}$ $\frac{1}{1}$

$(\frac{1}{2})^3 - (\frac{1}{2})^2 - 2(\frac{1}{2})$ $1^3 - 1^2 - 2 \cdot 1$

$\frac{1}{8} - \frac{1}{4} + \frac{1}{1}$ $1 - 1 - 2$

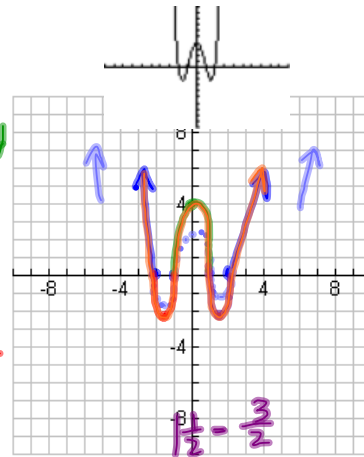
$-\frac{1}{8} - \frac{2}{8} + \frac{8}{8}$ -2

Oct 5 - 10:58 AM

Graph $y = x^4 - 5x^2 + 4$

x-int
 $0 = x^4 - 5x^2 + 4$
 $(x^2 - 4)(x^2 - 1)$
 $(x-2)(x+2)(x-1)(x+1)$
 zeros 2, -2, 1, -1

y-int
 $y = 0^4 - 5 \cdot 0^2 + 4$
 $y = 4$



$-\frac{1}{2} = -\frac{3}{2}$

$(-\frac{3}{2})^4 - 5(-\frac{3}{2})^2 + 4$
 $\frac{81}{16} - \frac{5 \cdot 9}{4 \cdot 4} + \frac{4 \cdot 16}{1 \cdot 16}$
 $\frac{81}{16} - \frac{180}{16} + \frac{64}{16}$
 $-\frac{35}{16} = -2\frac{3}{16}$

$\frac{1}{2} = \frac{3}{2}$
 $(\frac{3}{2})^4 - 5(\frac{3}{2})^2 + 4$
 $= -2\frac{3}{16}$

Oct 5 - 10:59 AM

Oct 13-8:37 AM