Questions From Homework

①a) $y=(x-2)(x+3)^2$

(i) **xint (y=0)**

$0=(x-2)(x+3)^2$

$0=(x-2)(x+3)(x+3)$

$x=2,-3,-3$

(ii) 3^{rd} Degree

(iii) **y int (x=0)**

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

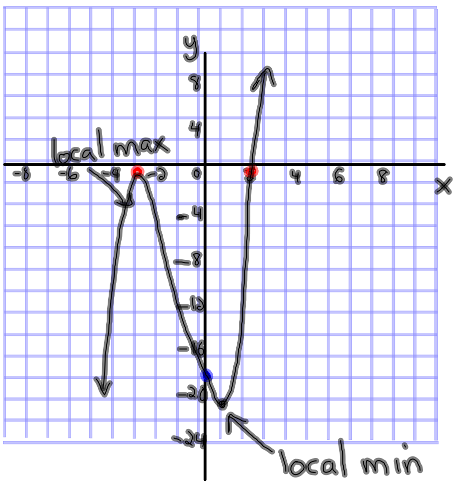
$y=-18$

(iv) **Stretch factor**

a = 1 (Positive)

Starts in Q3

Ends in Q1



e) $y=-(x+3)^3$

(i) **xint (y=0)**

$0=-(x+3)(x+3)(x+3)$

$x=-3,-3,-3$

(ii) 3^{rd} Degree

(iii) **y int (x=0)**

$y=-(3)^3$

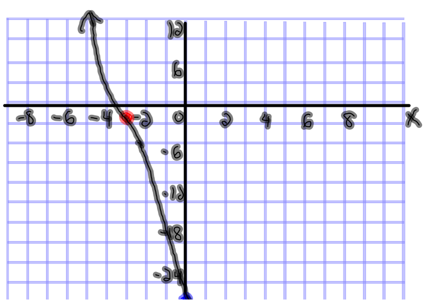
$y=-27$

(iv) **Stretch factor**

a = -1 (Negative)

Starts in Q2

Ends in Q4



Polynomial Functions

Polynomial - an algebraic expression consisting of two or more terms. A polynomial usually contains only one variable. Within each term the variable is raised to a non-negative integer power, and is multiplied by a constant. The simplest types of polynomials are binomials (two terms) and trinomials (three terms)

Degree of a Polynomial - the greatest power to which the variable is raised; for example, the degree of the trinomial $x^4 - 2x + 5$ **is 4**

A *polynomial* function with real coefficients can be represented by

$$y = f(x) = ax^n + bx^{n-1} + cx^{n-2} + \ldots + \square x^0$$

where *a, b, c, etc.* are real numbers. The shape of the graph of the function is affected by the value of *n (the Degree of the Polynomial)*, the values of the cooefficients, and whether the value of *a* is positive or negative.

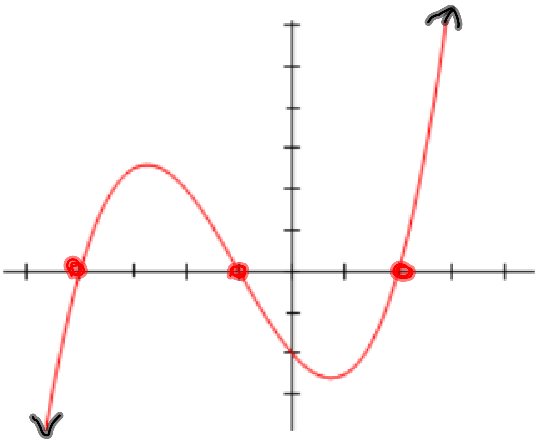
Cubic Functions

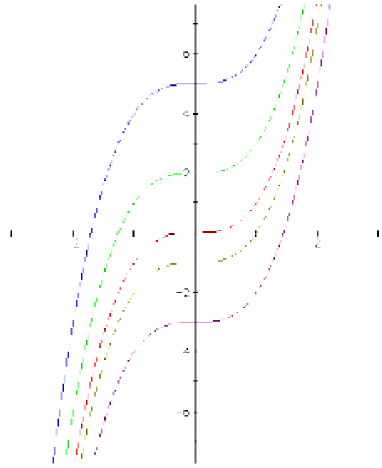
Cubic Functions

3rd degree Polynomials. ⟷ $y = ax^3 + bx^2 + cx + d$

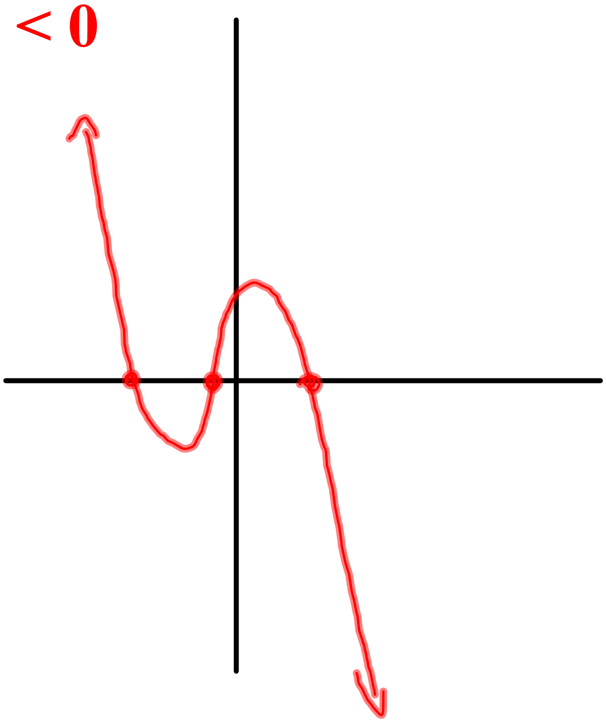
factored form $y = a(x - r_1)(x - r_2)(x - r_3)$

a > 0





a < 0



A cubic function has three roots. Either one or three of these roots will be real numbers. Any other roots are complex numbers. The number of *x-intercepts* on the graph of the corresponding cubic function *y= f(x)* depends on the nature of the roots.

Three different real roots

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

Three equal real roots

$$y = -(x-2)^3$$

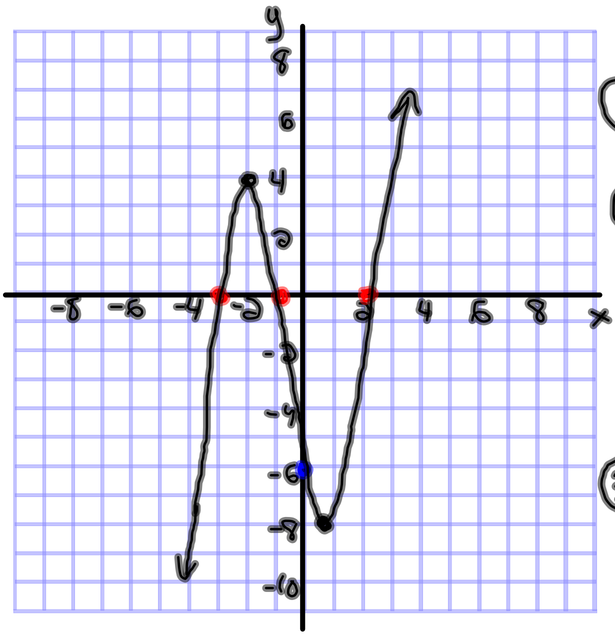
Three real roots (2 are equal)

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

Local Maximum - is the highest point in its immediate region of *x-values.*
This may or may not be the greatest value of the function over its entire domain.

Local Minimum - is the lowest point in its immediate region of *x-values.*
This may or may not be the smallest value of the function over its entire domain.

Approximate Local Max and Min values!



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

① Degree = 3

② xint (y=0)

$0=(x-2)(x+1)(x+3)$

$x=2, -1, -3$

③ yint (x=0)

$y=(-2)(1)(3)$

$y=-6$

④ Stretch Factor

a=1 (Positive)

Starts in Q3

Ends in Q1

⑤ local max (x=-2)

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

$y=(-4)(-1)(1)$

$y=4$

$(-2,4)$

local min (x=0.5

$y=(x-2)(x+1)(x+$

$y=(-1.5)(1.5)(3.$

$y=-7.875$

$(0.5,-7.875)$

Calculating Max and Min values on the TI-83

Homework