PreCalc 12 Chp 1 Review/Ref Sheet

Note Title 2013-09-29

TBLSET on TI-83

Remainder Theorem used solve $P(x)$ divided by $x-a$ with remainder. $P(a) = R(a)$.

eg) $x^3 + kx^2 - 5x + 17$ divided by $x-3$ has a remainder of 6.

$(3)^3 + k(3)^2 - 5(3) + 17 = 6$

Factor Theorem used to solve $P(x)$ divided by $x-a$ with no remainder. $P(a) = 0$

eg) Find k, so that $x+1$ is a factor of $x^3 + kx^2 + 3x + 1$

$(-1)^3 + k(-1)^2 + 3(-1) + 1 = 0$

Factor Property used to find potential factors.

eg) Is $x-7$ a factor of $x^3 + 5x^2 - 2x + 24$?

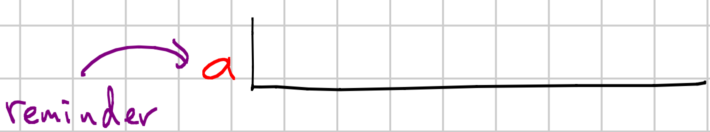
No, because 7 is not a factor of 24.

Strategies:

For degree ≥ 3, use factor property and theorem.
If factor not found, use Intermediate Value Theorem.
If found, use synthetic division for new dividend.
If dividend has degree 2, use quadratic factoring otherwise start again.

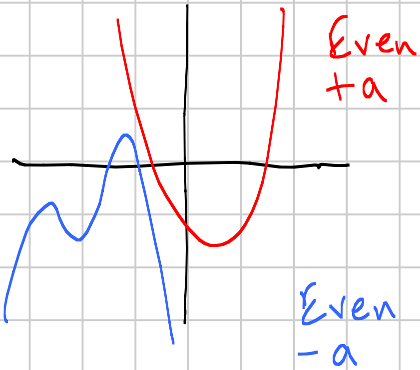
Synthetic Division

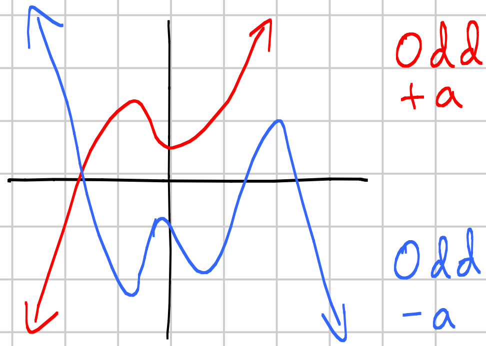
For division of $P(x)$ by $x-a$.



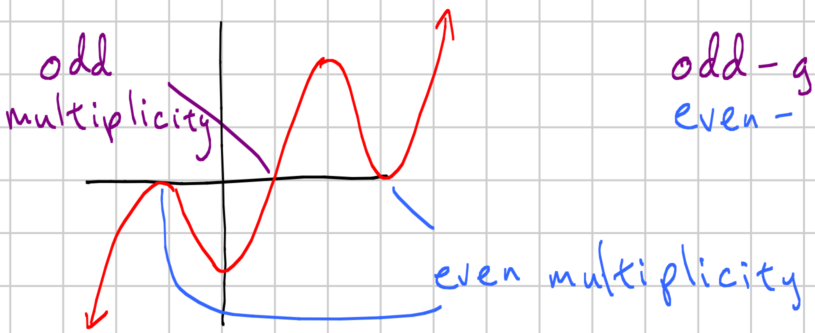
If not monic linear binomial, use polynomial long division.

Even/Odd Degree Polynomials.





Even/Odd Multiplicity



odd - goes thru x-axis
even - bounces off x-axis.

Properties

Odd degree polys never have global min/max.
Even degree polys have either a global min or max but not both.
Degree 'n' polys have at most 'n' zeroes.
Degree 'n' polys have at most 'n-1' peaks and valleys.
The larger the spacing between zeroes means the larger the peak or valley.

Factored Form:

$$y = a(x-x_1)(x-x_2)\ldots$$

General or Standard Form:

$$y = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_1 x + a_0$$

The theorems in this chapter apply
To polynomials with integer coefficients.
Polynomials can have real value coefficients.