Functions: One output for each input (no $y^2 = x$ for a function on x) domain=input range=output be cautious with denominators $f(x) = y = x + 2x^2 + 5$ write ordered pairs for the graph Functional notation: think of like machine

Polynomials: x-intercept: solve y-intercept:plug in 0 for x Multiplicity: number of times value appears as root Even/odd multiplicity ¡=¿ touches/crosses axis $(x - r)$ a factor of P iff $P(r) = 0$ Poly of degree n has n roots (real or complex) Quad: $ax^2 + bx + c$ roots: $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$ Conj pairs: if $a + \sqrt{b}$ is a root, so is $a - \sqrt{b}$ if $a + bi$, then $a - bi$

Synthetic division: $\frac{P(x)}{D(x)}$ $P(x) = Q(x)D(x) + R(x)$
For P, take coefficients. when D is $x - a$, take a to the right

p_3	p_2	p_1	p_0	a
	$p_3\dot{a}$			
p_3	$p_2 + p_3\dot{a}$			

p_3	p_2	p_1	p_0	a
	$p_3\dot{a}$	$q_1\dot{a}$		
p_3	q_1	$p_1 + q_1\dot{a}$	$\star$	

keep going, when all exhausted, last value (at $\star$) is your remainder

Complete squares

Even: $f(-x) = f(x)$ is even, $f(-x) = -f(x)$ is odd

Rational funcs: check denom ALWAYS

EXP: $\log_a x = \frac{\log_b x}{\log_b a}$ $\log_a xy = \log_a x + \log_a y$ $\log \frac{x}{y} = \log x - \log y$ $\log x^y = y \log x$ $\log_a x = y \Rightarrow a^y = x$

SLANT asymptotes: eqn gotten from long division (ignore remainder)