



Chapter 5

Power, Polynomial & Rational Functions

Cornell Notes/Summary Sheet

Name: _____

Period: _____

$$a^m a^n = a^{m+n} \quad (a^m)^n = a^{mn} \quad (ab)^m = a^m b^m \quad \sqrt{x} = x^{\frac{1}{2}} \quad \sqrt[n]{x^m} = x^{\frac{m}{n}}$$

$$\frac{a^m}{a^n} = a^{m-n} \quad \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad \frac{1}{a^m} = a^{-m} \quad \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m$$

Lesson 5.2 – Big Ideas

- Power functions
- Direct, inverse & joint variation

Your Notes

Varies directly	Varies inversely	Varies jointly

- The end behavior/limits of powers functions
- Analyzing of power functions: the effects of k & a on the graph

	x^E	x^O	x^{-E}	x^{-O}	$x^{1/E}$	$x^{1/O}$
$\lim_{x \rightarrow -\infty} f(x)$						
$\lim_{x \rightarrow \infty} f(x)$						

Lesson 5.1: Big Ideas

- Successive differences of polynomial functions

Your Notes

y-values	1 st differences	2 nd differences	3 rd differences

- Long-run/end behavior of polynomial functions
- The Leading Term Test

	Even		Odd	
	Positive	Negative	Positive	Negative
$\lim_{x \rightarrow -\infty} f(x)$				
$\lim_{x \rightarrow \infty} f(x)$				

- Short-run behavior of polynomial functions
- Multiplicity and x -intercepts
- Finding zeros/roots/ x -intercepts of polynomial functions
- Constant/ y -intercept
- Sketching a polynomial function
- Finding a formula for a polynomial function
- Synthetic division

Lesson 5.3 – Big Ideas

- Rational functions
- Long-run/end behavior of rational functions
- Horizontal asymptotes
- Domain
- Vertical asymptotes
- Horizontal/ x -intercepts
- Vertical/ y -intercept
- Holes
- Graphing a rational function
- Finding a formula for a rational function

Your Notes

Comparison Test	$N^\circ = D^\circ$	$N^\circ < D^\circ$	$N^\circ > D^\circ$
End Behavior			
Horizontal Asymptote			

① End behavior asymptote/ horizontal asymptote	Compare the degrees of the numerator & denominator. If $N^\circ < D^\circ$, then $y = 0$. If $N^\circ = D^\circ$, then $y = \text{ratio}$.
② y -intercept	Plug 0 in for x & calculate.
③ Factor the numerator and denominator	
④ Identify the domain	Where does the denominator equal 0?
⑤ Cancel out any common factors; write the "reduced function"	
⑥ x -coordinate of hole	Zeros of the common factor(s)
y -coordinate of hole	Plug hole's x -coordinate into reduced function
⑦ vertical asymptote(s)	Zeros of the remaining factor(s) in the denominator
⑧ x -intercept(s)	Zeros of the remaining factor(s) in the numerator