

Semester Two Final Study Guide



TOPICS

Multiplying and Dividing Polynomials
 Synthetic Division and Factoring
 Polynomial Factoring
 Solving Quadratic Equations
 Complete the Square
 Quadratic Formula
 Graphing Quadratic Functions
 Rational Expressions
 Complex Fractions
 Radicals

VOCABULARY

term	power	coefficient	polynomial
base	exponent	binomial	monomial
slope	reciprocal	x-intercept	y-intercept
vertex	parabola	domain	asymptote
range			

KNOW THE FOLLOWING

Synthetic Division
 Cartesian Coordinates
 Polynomial Long Division
 Polynomial Factoring
 Squared Binomials
 The Difference of Two Squares
 Graphing Functions

BE ABLE TO

multiply/divide polynomials	find the domain/range
factor trinomials	multiply rational expressions
do long division	divide rational expressions
do synthetic division	graph rational functions
find GCF and factor	determine the asymptotes
graph quadratics	rationalize and simplify

VIDEO TOOLBOX

Exponents	Fractions
Polynomial Functions	Rational Expressions

Polynomial

A polynomial is a term or a combination of terms in the form:

$$ax^n$$

The coefficient “a” is a real number and the exponent “n” is a positive integer or zero.

monomial – a polynomial of one term.

binomial – a polynomial of two terms.

trinomial – a polynomial of three terms.

Multiplying Binomials

$$(x + 3)(x + 1) = x^2 + 4x + 3$$

Binomial Squared

$$(a+b)^2$$

1. First term square it. a^2
2. multiply first to second and double it. $2ab$
3. Second term square it. b^2

$$a^2 + 2ab + b^2$$

Functions

A function is an algebraic relationship in which there is one and only one dependent for the independent. The independent is the domain and the dependent is the range.

x=independent and
 y=dependent (usually)

Vertical Asymptotes

The zeroes of the polynomial in the denominator.

$$x = a$$

Complete the Square

1. $x^2 + 6x - 4 = 0$
2. $(x^2 + 6x \quad) = 4$
3. $\frac{6}{2} = 3 \quad (3)^2 = 9$
4. $(x^2 + 6x + 9) = 4 + 9$
5. $(x + 3)^2 = 13$
6. $\sqrt{(x + 3)^2} = \sqrt{13}$
7. $x + 3 = \pm\sqrt{13}$
8. $x = -3 \pm \sqrt{13}$

Rational Function Domain

All real numbers except those that make the denominator zero.

Rational Function Graphs

An algebraic ratio written as a fraction is a rational expression.

1. Factor completely
2. Determine the domain
3. Find the vertical asymptotes
4. Find the horizontal asymptotes
5. Determine the x-intercept
6. Determine the y-intercept
7. Find some points on the graph
8. Plot and connect the dot

Radicals

radical $\rightarrow \sqrt[n]{X^m} = X^{m/n}$

index \nearrow

radicand \uparrow

Quadratic Formula

The quadratic formula is derived from completing the square on the standard form of a quadratic equation.

Standard form:

$$ax^2 + bx + c = 0$$

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Rational Expression

An algebraic ratio written as a fraction is a rational expression.

$$\frac{x^2 + 5x + 6}{x + 2}$$

Graphs of Parabolas

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

Complete the square:

Opens upward \swarrow

y coordinate of vertex = -2 \downarrow

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

Axis of symmetry = 2 \nearrow