

ALGEBRA 2 - FINAL EXAM STUDY GUIDE

CHAPTER 5 Quadratic Equations and Functions

We did Chapter 5 before the midterm, but we used many of the things we learned there throughout the rest of the course. These are the most important topics from Chapter 5, those that you'll need to know for the Final Exam:

- (5-1) Standard form of a quadratic function: $f(x) = ax^2 + bx + c$
- (5-4) Steps for factoring a quadratic expression:
Look for a Greatest Common Factor
Multiply $a \cdot c$
Find two numbers that multiply to equal $a \cdot c$ and add to equal b
Factor using these two numbers (x-box method or other)
- (5-5) Zero Product Property: If $a \cdot b = 0$, then either $a = 0$ or $b = 0$
Set one side of equation equal to zero, factor, then set each individual factor equal to zero.
Solve a quadratic equation by finding square roots: When there is no linear (x) term.
- (5-8) Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
To use the Quadratic Formula: Put the equation in standard form (equal to zero), plug in a, b, c .

CHAPTER 6 Polynomials and Polynomial Functions

- (6-1) Standard form of a polynomial: $P(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$ (descending order by degree)
Classify a polynomial: By degree and number of terms
Names of degrees 0 through 5: Constant, linear, quadratic, cubic, quartic, quintic
Names for 1 through 4 terms: Monomial, binomial, trinomial, polynomial of 4 terms
- (6-2) Factor Theorem: The expression $(x - a)$ is a factor of a polynomial if and only if a is a zero of the related polynomial function.
- (6-3) Steps for polynomial long division:
1. Divide first term on the outside into first term on the inside - write answer on top.
2. Multiply answer on top by entire expression outside - write answer below.
3. Subtract. Bring down remaining inside terms. Repeat.
Set-up for synthetic division:
1. Change sign on number outside and put in box.
2. Rewrite coefficients from inside next to the box.
- (6-4) Sum of Cubes formula: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
Difference of Cubes formula: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
Know how to factor using the sum and difference of cubes formulas.
Know how to factor using a quadratic form.