

Major Topics

- Polynomial Functions
- Zeros and Linear Factors
- Solving Polynomial Equations
- Polynomial Division
- Synthetic Division
- Remainder Theorem
- Rational Root Theorem
- Fundamental Theorem of Algebra

Vocabulary

- Standard form of a polynomial function
- Lead coefficient
- Turning points
- Zero
- Root
- Factor
- Multiplicity (or multiple zeros)
- Relative maximum, relative minimum

You should be able to:

- Classify polynomials by degree and number of terms
- Determine the end behavior and number of turns of a polynomial function
- Write a polynomial function with given zeros (or roots)
- Solve polynomial equations by finding zeros
- Divide polynomials using polynomial long division
- Divide polynomials using synthetic division (and know when this is appropriate)
- List all possible rational roots of a polynomial function
- Determine the number of solutions to a polynomial equation (counting complex and repeated solutions)
- Use polynomial functions to model and solve every day problems

Classwork:

1) Write each polynomial function in standard form, classify it by degree and number of terms, and determine the end behavior of the graph.

a) $y = 3x + 2x^2 - 5x^5$

b) $f(x) = 1 - x^4$

2) Write a polynomial function in standard form with the given zeros:

a) 0, 1, -3

b) 2, 2, -2, -1

3) Solve the following polynomial equations by factoring:

a) $3x^3 + 24x^2 = 27x$

b) $x^4 - 3x^2 + 1 = 2x^2 - 3$

4) Divide using polynomial long division:

a) $(6x^3 - x^2 - 8x + 1) \div (2x + 1)$

b) $(x^4 + 2x - 1) \div (x - 3)$

5) Divide using synthetic division:

a) $(2x^3 - 3x^2 - x + 1) \div (x + 1)$

b) $(x^4 + 5x + 7) \div (x - 1)$

6) List all possible rational roots (you do NOT have to find the actual roots) of the function:

a) $y = 2x^2 - 5x + 7$

b) $f(x) = 3x^3 - 2x^2 + 8x - 12$

7) Write a polynomial function with rational coefficients that has the following roots:

a) $1, 1 + 2i$

b) $2 + \sqrt{3}, i$

Chapter 5 Review Homework

1) Write each polynomial function in standard form, classify it by degree and number of terms, and determine the end behavior of the graph.

a) $y = 3x^2 - 4x^3 + 1$

b) $f(x) = -x^2 + x^3 - x^4$

2) Write a polynomial function in standard form with the given zeros:

a) 0, 0, -1

b) 0, 1, -2, 3

3) Solve the following polynomial equations by factoring:

a) $x^3 - 4x^2 + 3x + 1 = x^2 - 3x + 1$

b) $3x^4 - 24x = 0$

4) Divide using polynomial long division:

a) $(6x^3 - 7x^2 + 1) \div (3x + 1)$

b) $(x^4 + x^3 + x^2 + 1) \div (x + 1)$

5) Divide using synthetic division:

a) $(x^3 - 4x^2 - 2x + 4) \div (x + 3)$

b) $(x^4 + 5x + 1) \div (x - 2)$

6) List all possible rational roots (you do NOT have to find the actual roots) of the function:

a) $y = 4x^2 - 3x + 2$

b) $f(x) = 3x^3 - x^2 - 4x - 8$

7) Write a polynomial function with rational coefficients that has the following roots:

a) 0, $1 - 3i$

b) $\sqrt{5}$, $2i$