Math III – Unit 3 Polynomials

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| **Date** | **Lesson/Objective** | **Homework** | **Checked** |
| **Day 1:**Monday Oct 3 | **Polynomial Degree and End Behavior***Objective: To determine the degree and end behavior of a given polynomial**Objective: To factor a quadratic equation set equal to aero and then solve for the variable.* | 3-1  |  |
| **Day 2:**TuesdayOct 4 | **Bus Project***Objective: to determine a mathematical expression for the turning of a bus**Objective: to determine why a bus must take wide turns*  |  |  |
| **Day 3:**WednesdayOct 5 | **Polynomial Graphs (zeros and multiplicity)***Objective: to determine the zeros and multiplicity for the given polynomial**Objective: to determine the graph of a function based on the zeros and multiplicity of the polynomial*  | 3-2 |  |
| **Day 4:**ThursdayOct 7 | **Imaginary and Irrational Root Theorem**Objective: To determine the polynomial from the roots and multiplicity (including imaginary and irrational roots)Objective: to add polynomials and write in standard form | 3-3 |  |
| **Day 5:**FridayOct 8 | **Multiply polynomials**Objective: to multiply polynomials using the box method and write in standard form | 3-4 |  |
| **Day 6:**Monday Oct 11 | **Long Division**Objective: To use long division to divide polynomials | 3-5 |  |
| **Day 7:**Tuesday Oct 12 | **Synthetic Division**Objective: To use synthetic division to divide polynomialsObjective: To determine when to use synthetic or long division | 3-5 |  |
| **Day 8:**WednesdayOct 13 | **Remainder Theorem**Objective: use synthetic division to determine whether a polynomial is a factor of another polynomial. | 3-6 |  |
| **Day 9:**ThursdayOct 14 | **Review** | Review |  |
| **Day 10:**FridayOct 15 | **Unit 3 Test** | Unit 4 Pretest |  |
|  |  |  |  |  |

HW 3-1

Write each polynomial in standard form and classify it by degree and number of terms. Then, state the end behavior for each based on its degree and leading coefficient.

1. 2.

Degree:\_\_\_\_\_\_\_\_\_\_\_\_L.C.:\_\_\_\_\_\_\_\_\_\_\_ Degree:\_\_\_\_\_\_\_\_\_\_\_\_L.C.:\_\_\_\_\_\_\_\_\_\_\_

Classification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Classification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End Behavior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ End Behavior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 3. 4.

Degree:\_\_\_\_\_\_\_\_\_\_\_\_L.C.:\_\_\_\_\_\_\_\_\_\_\_ Degree:\_\_\_\_\_\_\_\_\_\_\_\_L.C.:\_\_\_\_\_\_\_\_\_\_\_

Classification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Classification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

End Behavior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ End Behavior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. a) What is the domain and range of ?

Domain: \_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Suppose the polynomial represents the temperature of a body of water over several days. What are the practical domain and range?

Practical domain: ­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Practical range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. For the following set of points, which type of model fits best? A linear, quadratic, cubic, or quartic model? Write the equation for the model and find the value of the function at x = 30. Make sure you turn your diagnostics on!

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | 0 | 5 | 10 | 15 | 20 |
| **y** | -4 | 60 | 230 | 490 | 860 |

Model: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f(30) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

HW 3-2

Using the given equation in the table, fill in the rest for each example. Lastly, match each polynomial to its correct graph shown below. The first one is done for you. **Some of them don’t have matches!**

|  |  |  |  |
| --- | --- | --- | --- |
| Equation | Graph | Degree | (Root, multiplicity) |
|  | D | 6 | (0,1) (-2,2) (-3, 3) |
|  |  |  |  |
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Describe the zeros, multiplicity, and end behavior of the graph of each function.

Sketch the graph of the polynomial based on the end behavior, zeros, and multiplicity.

1. 4.

5. A meteorologist is using the polynomial to model the temperature at the beginning of winter as the months pass. What are the practical domain and range of the model?

HW 3-3

A polynomial function with rational coefficients has the follow zeros. Find all additional zeros and write all zeros in binomial form. (ex. A zero at 4 would be written (x-4).

|  |  |
| --- | --- |
| 1. -5, i
 |  |
|  | 1. 2-2i, 1-2i
 |

Simplify each expression.

1. Write a polynomial function **in factored form** with roots at x = -2, multiplicity 2, x = 1/2, multiplicity 3, and x = 0, multiplicity 2.
2. (
3. Find a 3rd degree polynomial equation with rational coefficients that has 2 and 4 + i as roots.

HW 3-4

Multiply and simplify the following:



1. :
2. :



1. :

5. The glass portion of a window has a height to width ratio of 3:2, so the height of the glass portion can be represented as 3x and the width of the glass can be represented as 2x. The wood trim adds 7 inches total to the width and 8 inches total to the height. Write a polynomial expression that represents the total area of the window including the glass and wood. Simplify the expression.

6. You are making a new serving tray for your coffee table, and you want to maximize the volume of the tray while minimizing the metal used. You begin with a piece of metal that is 12 inches long by 7 inches wide, then cut squares from each corner and fold them up to create edges. What should the side length of your square be in order to maximize the volume of the tray? What will the volume be?

HW 3-5

**Divide using long division.**



**Use synthetic division to find out whether the divisor is a factor of the polynomial.**





HW 3-6

**Use the Remainder Theorem to find out if the divisor is a factor. If not, what is the remainder?**

1. 2)

3) 4)

**Use your calculator to find a zero of the given polynomial. Then, use division to find the remaining factors.**

5) 6)