**2CP Unit 4 Polynomials You Can/Review Answers**

Make sure you can demonstrate each of the following skills. For each number, complete the problem(s) given, and then find one more similar problem in the homework or notes to complete. You will need the “Writing Polynomial Equations WS” (separate document).

**Polynomials Test Part 1: No Calculator**

1. *Prove a polynomial identity*:

2a.

* *Describe the lowest possible degree of the polynomial 3*
* *Determine if the leading coefficient is positive or negative positive*
* *Describe the domain and range using interval notation D: R:*
* *Identify all absolute and relative maxima and minima no absolute max or min, relative max at (-2.7,12), relative min at (1.3,-21)*
* *Describe the end behavior using appropriate mathematical notation* ;
* *Identify where the function is increasing and decreasing, using interval notation. Increasing (*
* *Identify where and where . (-4,-1);*
* *Write a possible polynomial equation of the graph.*

2b. *lowest possible degree of the polynomial 4*;  *leading coefficient negative*

* *Describe the domain and range using interval notation D: R:*
* *maxima and minima no absolute min, relative max at (-1.4,5), rel. min at (0,0), abs. max at (2.1, 17)*
* *Describe the end behavior* ;
* *Increasing (*
* *(-2,0);*

*possible polynomial equation of the graph.*

3.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | b. | c. |
| Factor if necessary | Already fully factored |  |  |
| Find solutions/x-ints | x=0, 4, 2 | x=0, 5, 3, -3 | X=0, -1/3, 7 |
| Find multiplicity | 0 and 4 have mult of 1 (odd, through)  2 has a mult of 2 (even, bounce) | 0 has a mult of 2 (even, bounce); the rest have a mult of 1 (odd, through) | All have a mult of 1 (odd, through) |
| Determine end behavior | Degree of 4, positive leading coefficent, both sides go down | Degree of 5, negative leading coefficient. Up on the left, down on the right | Degree of 3, positive leading coefficient. Down on the left, up on the right. |
| Sketch the graph. Start with the x-ints, then end behav., then the rest |  |  |  |

*4. Show that a given polynomial is a factor of a polynomial and find the remaining factors.*

|  |  |
| --- | --- |
| a. | b. |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | -1 | 1 | 5 | 8 | 4 | |  |  | -1 | -4 | -4 | |  | 1 | 4 | 4 | 0 | | |  |  |  |  |  | | --- | --- | --- | --- | --- | | 2 | 1 | -6 | 11 | -6 | |  |  | 2 | -8 | 6 | |  | 1 | -4 | 3 | 0 | |
|  |  |

*5. Find all complex solutions (real and imaginary), of a polynomial equation.*

|  |  |  |
| --- | --- | --- |
| a. | b. | c. |
|  |  |  |

*6. Divide a polynomial using long division.*

**Polynomials Test Part II: Calculator**

1. *Find all possible rational roots of a polynomial function*.

2. *Find all zeros (real and imaginary) of a polynomial function.* (Hint: Use your graphing calculator to help you find a real, rational root, then go from there).

The graphing calculator shows rational zeros at -2 and 1. Starting with either one, use synthetic division.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 2 | 4 | -8 |
|  |  | 1 | 2 | 4 | 8 |
|  | 1 | 2 | 4 | 8 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| -2 | 1 | 2 | 4 | 8 |
|  |  | -2 | 0 | -8 |
|  | 1 | 0 | 4 | 0 |

Now, solve

All zeros are: *1, -2, 2i, -2i*

3. *Find all real zeros of a polynomial using the graphing calculator and tell how many complex zeroes there are.*

a. real zeroes: -2.51 and 0.2085; 2 imaginary zeros for a total of 3 zeros

b. real zeros: -3; 2 imaginary zeros for a total of 3 zeros

4. Connect features of a polynomial graph with a real world situation it represents.

The percent of the US population born outside the United States from 1900 to 2000 can be modeled by the equation where t is the year since 1900.

a. Use your calculator to sketch a graph of the function.

b. During what year was the percentage of foreign born at a minimum? Label it on the graph. 1974

c. During what years was the percentage of foreign born decreasing? From 1903-1974

d. Would it be reasonable to use this model after the year 2000? Explain why. Yes, but only for part of the century. After about 2064 because after that it surpasses 100%.

*5. Solve an application such as the USPS or Red Vine Activity.*

See Writing Polynomial Equations WS (Separate document); You do NOT need to find an additional problem for this skill. See solutions for poly equations ws