Section 5-3: Homework Handout

Solving Polynomial Equations by Factoring or Graphing

Standard A-SSE.2, A-SSE.3, N-CN.7, A-REI.11

* Factoring polynomial functions and identifying zeros when the function is in factored form.
* Solving polynomial functions by graphing and identifying the zeros of the graph.

Use the cubes patterns to find the real/imaginary solutions for the following equations.

1) $x^3 = 27$

2) $x^3 - 64 = 0$

3) $16x^3 - 2 = 0$

4) $64x^3 = -8$

Each of the following equations is quadratic in nature (the middle term's variable is the square root of the leading term's variable). Factor each equation by finding the pattern and then identify all real and imaginary solutions.

5) $x^4 - 10x^2 = -9$

6) $x^4 = 8x^2 - 16$

7) $x^4 + 7x^2 = 18$

8) $x^4 + 4x^2 = 12$

The following equations do not factor by the methods that we have studied to this point. Find the real solutions to the equations by graphing them. Notice that the solutions are real and rational, so the equations must be factorable. In the next section we will begin to explore factoring higher degree functions based on some new techniques and theorems.

9) $x^3 - 4x^2 - 7x = -10$

10) $3x^3 = 6x^2 + 9x$

11) $x^3 - x^2 - 16x = 20$

12) $x^4 - 4x^3 - x^2 = -16x + 12$

Solve the following problems by assigning a variable, putting together an equation, and then graphing the equation and using the zero's to answer the question. Answer with a statement and appropriate labels.

13) The Johnson twins were born 2 years after their older sister. This year, the product of the three sibling's ages is exactly 4558 more than the sum of their ages. How old are the twins?

14) The product of three consecutive integers is 210. What are the integers?

15) The width of a storage box is 1 foot longer than the height. The length of the box is 4 feet longer than the height. The volume of the box is 36 ft^3. What are the dimensions of the box?

Solve each of the following equations by factoring. Note the degree of the equation and find "all" of the solutions, both real and/or imaginary. When factoring an equation with 4 terms, you will need to factor by grouping.

16) $x^3 + 13x = 10x^2$

17) $x^3 - 6x^2 + 6x = 0$

18) $x^5 = 5x^3 - 4x$

19) $x^3 + x^2 = -x - 1$

20) $x^3 + 1 = x^2 + x$

Error Analysis:

21) A friend claims that 1, 2, 3, and 4 are the zeros of a cubic polynomial function. Explain why your friend is incorrect.

22) Your friend also claims that the zeros of $3x^3 + 7x^2 - 22x - 8 = 0$ are -4, 2, and -1. What did your friend do wrong this time? What are the correct zeros for this equation?