

Name: _____ Hour: _____ Date: _____

NOTES: Section 5.5 – Apply the Remainder and Factor Theorems

Goals: #1 - I can perform polynomial long division.



#2 - I can divide polynomials synthetically.

#3 - I can factor a 3rd degree polynomial when one factor is given.

#4 - I can find the zeros of a 3rd degree polynomial when one zero is given.

Homework: Lesson 5.5 Worksheet

Exploration #1: Work with a partner and answer the following questions.

1. Use long division to find the following quotients.

a. Divide 258 by 6.

b. Divide 1122 by 17.

c. Divide 289 by 8.

d. Divide 1704 by 18.

Notes:

One way to divide _____ is called _____.

Example #1: Divide using polynomial long division.

1. $(x^3 + 5x^2 - 7x + 2) \div (x - 2)$

2. $(3x^4 - 5x^3 + 4x - 6) \div (x^2 - 3x + 5)$

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You practice: Divide using polynomial long division.

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

2. $(x^3 - x^2 + 4x - 10) \div (x + 2)$

Notes:

Another way to divide _____ is called _____.

THIS ONLY WORKS WHEN _____ BY A _____ POLYNOMIAL!

Example #2: Divide using synthetic division.

1. $(x^3 + 5x^2 - 7x + 2) \div (x - 2)$

2. $(2x^3 + x^2 - 8x + 5) \div (x + 3)$

You practice: Divide using synthetic division.

1. $(x^3 - x^2 + 4x - 10) \div (x + 2)$

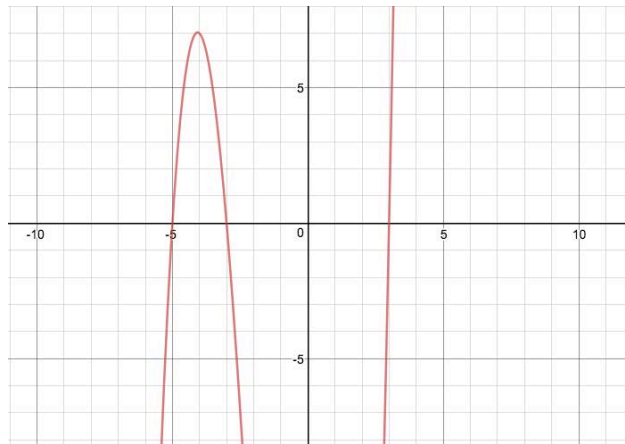
2. $(4x^3 + x^2 - 3x + 7) \div (x - 1)$

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Exploration #2: Work with a partner and answer the following questions.

1. Factor the polynomial $x^3 + 5x^2 - 9x - 45$ completely.

2. Below is a snapshot of the graph $f(x) = x^3 + 5x^2 - 9x - 45$. Find the zeros.



3. Find the real-number solutions of the equation $x^3 + 5x^2 - 9x - 45 = 0$

Notes:

- _____:

A _____ $f(x)$ has a _____ if and only if _____.

Example:

The factor theorem can be used to solve a variety of problems.

- Given one _____ of a polynomial, find the other _____.
- Give one _____ of a polynomial function, find the other _____.
- Given one _____ of a polynomial equation, find the other _____.

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Example #3: Factor $f(x) = 3x^3 - 4x^2 - 28x - 16$ completely given that $x + 2$ is a factor.

You practice: Factor $f(x) = x^3 - 6x^2 + 5x + 12$ completely given that $x - 4$ is a factor.

Example #4: Find the other zeros of the function $f(x) = x^3 - 2x^2 - 23x + 60$ given that 3 is zero.

You practice: Find the other zeros of the function $f(x) = x^3 + 8x^2 + 5x - 14$ given that -2 is zero.