Name: Kelly
CC ALGEBRA 2

Date: 10/5/17
TROICI

LESSON #8: LONG DIVISION WITH REMAINDERS

Do Now:

a) Use long division: $x+3\overline{)x^2+7x+12}$

$x+4$

$-x^2 \oplus 3x$

$4x+12$

$-4x \oplus 12$

0

b) Use long division to solve: $12\overline{)265}$

22 R1 OR $22\frac{1}{12}$

$24\downarrow$

25

-24

1

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1. Find the quotient of $x+2\overline{)2x^2+6x+5}$

$2x+2$

$-2x^2 \oplus 4x$

$2x+5$

$-2x \oplus 4$

1 → remainder!

$2x+2+\frac{1}{x+2}$

2. Find the quotient of $\frac{x^3-x^2+3x-1}{x+3}$

$x^2-4x+15$

$x+3\overline{)x^3-x^2+3x-1}$

$-x^3 \oplus 3x^2 \downarrow$

$-4x^2+3x$

$+4x+12x \downarrow$

$15x-1$

$-15x \oplus 45$

-46 → remainder!

$x^2-4x+15-\frac{46}{x+3}$

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1. Express the quotient as a polynomial with a remainder as a rational expression $\frac{x^2+4x+10}{x-8}$

$$x-8 \overline{)\, x^2+4x+10}$$

$x+12$

$-x^2+8x$ ↓

$12x+10$

$-12x+96$

106

$$x+12+\frac{106}{x-8}$$

2. The expression $\frac{x^3+2x^2+x+6}{x+2}$ is equivalent to

(1) x^2+3

(2) $x^2+1+\frac{4}{x+2}$

(3) $2x^2+x+6$

(4) $2x^2+1+\frac{4}{x+2}$

$$x+2 \overline{)\, x^3+2x^2+x+6}$$

x^2+0x+1

$-x^3\oplus 2x^2$ ↓

$0x^2+x$

$-0x^2\oplus 0x$ ↓

$x+6$

$-x\oplus 2$

4

$$x^2+1+\frac{4}{x+2}$$

3. Is $x-2$ a factor of x^3-8? Show all work and explain your answer.

Also, "SOC" $(x-2)(x^2+2x+4)$

Fill in missing terms!

$$x-2 \overline{)\, x^3+0x^2+0x-8}$$

x^2+2x+4

$-x^3+2x^2$ ↓

$2x^2+0x$

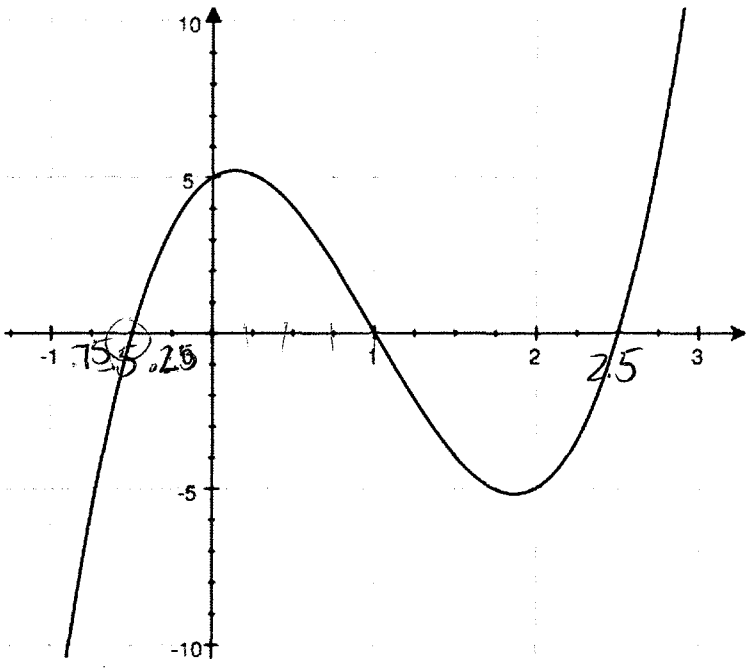
$-2x^2+4x$ ↓

$4x-8$

$-4x+8$

yes, $(x-2)$ is a factor b/c there is no remainder!

4. Based on the graph shown,



a) State all the solutions of this equation

$-.5, 1, 2.5$

b) State all the factors of this equation

$(x+.5)(x-1)(x-2.5)$

c) Write the equation in standard form.

$(x+.5)(x-1)(x-2.5)$

$x^2 - x + .5x - .5$

$x^2 - .5x - .5$

x	x^3	$-.5x^2$	$-.5x$
-2.5	$-2.5x^2$	$1.25x$	1.25

$y = x^3 - 3x^2 + .75x + 1.25$

5. Find question for even /odd functions.....Justify algebraically!!!

3. Is $x-4$ a factor of $x^2+3x-28$? **There are 2 ways to determine this!!**

OPTION 1: Long Division

$$x-4 \overline{)\, x^2+3x-28}$$

$$x+7$$

$$-x^2+4x \downarrow$$

$$7x-28$$

$$-7x+28$$

$$0$$

→ no remainder!

OPTION 2: AM factoring

$x^2 + 3x - 28$ (a = 1, m = −28)

$(x+7)(x-4)$ ✓

yes, $(x-4)$ is a factor b/c there is no remainder.

4. Is $2x-5$ a factor of $4x^3+5x-8$? We can't factor it, so we must use long division.

★ FILL IN MISSING TERMS ★

$$2x-5 \overline{)\, 4x^3+0x^2+5x-8}$$

$$2x^2+5x+15$$

$$-4x^3+10x^2 \downarrow$$

$$10x^2+5x$$

$$-10x^2+25x$$

$$30x-8$$

$$-30x+75$$

$$67$$

NO, $2x-5$ is not a factor b/c there is a remainder of 67.

5. Consider the polynomial function ~~$f(x) = 3x^2 + 8x - 4$~~.

FACTOR → ROOT!

a. Divide f by $(x-2)$.

$$x-2 \overline{)\, 3x^2+8x-4}$$

$$3x+14$$

$$-3x^2+6x \downarrow$$

$$14x-4$$

$$-14x+28$$

$$24$$

b. Find $f(2)$.

$f(2) = 3(2)^2 + 8(2) - 4$

$f(2) = 24$

OMG same!

If the remainder is 0, the divisor IS a factor of the dividend.

If there IS a remainder, the divisor IS NOT a factor of the dividend.