Synthetic Division

Uses the zero of the divisor.
By reversing the sign of the divisor you can ADD throughout the process instead of subtracting.

Works only when the divisor is linear and the leading coefficient = 1

Meaning either ÷(x + a) or ÷(x - a)

$$\frac{x^3 - 2x^2 - 31x + 20}{x + 5}$$

Zero of the Divisor: -5

Coefficients of the dividend in Standard Form: 1, -2, -31, 20

-5	1	-2	-31	20
		+-5	+35	+-20
	1	-7	4	0

Bring down the first #

Multiply and ADD

$-5x^2 - 7x + 4 \quad R=0$

Find this quotient using Synthetic Division

$$\frac{2x^3 - 7x^2 + x - 13}{x - 2}$$

Before doing synthetic division make sure that there are no missing terms. If a term is missing you must put a zero in its spot.

2	2	-7	1	-13
		4	-6	-10
	2	-3	-5	-23

$2x^2 - 3x - 5 \quad R=-23$

When using synthetic division the degree of the quotient will always be one less than the degree of the dividend.

Find this quotient using Synthetic Division

$$\frac{5x^4 - 2x^3 + 7x^2 - 6x + 3}{x + 4}$$

Before doing synthetic division make sure that there are no missing terms. If a term is missing you must put a zero in its spot.

-4	5	-2	7	-6	+3
		-20	88	-380	1544
	5	-22	95	-386	1547

$5x^3 - 22x^2 + 95x - 386 \quad R=1547$

Find this quotient using Synthetic Division.

$\frac{4x^3 - x + 9}{x - 3}$

The dividend is missing a quadratic term. You must place a zero in this spot.

3	4	0	−1	9
		12	36	105
	4	12	35	114

$4x^2 + 12x + 35 \quad R = 114$

Is $x - 5$ a factor of $2x^3 - 3x^2 - 39x + 20$?

5	2	−3	−39	20
		10	35	−20
	2	7	−4	0

Yes $x-5$ is a factor because there is no remainder

Is $x - 3$ a factor of $2x^3 - 12x^2 + 21x - 9$?

3	2	−12	21	−9
		6	−18	9
	2	−6	3	0

Yes, $x-3$ is a factor because there is no remainder

$(x + 7)$ is a factor of $x^3 + 11x^2 + 23x - 35$.

Find the other two factors. Divide by x+7 to find another factor.

−7	1	11	23	−35
		−7	−28	35
	1	4	−5	0

$x^2 + 4x - 5$ → FACTOR THIS TO FIND other two factors

-5, $+5$, -1, $+4$ $\Rightarrow$ $(x+5)(x-1)$

$x+6$ is a factor of $x^3+5x^2-18x-72$.

Use this factor to help you factor this cubic completely.

Divide by x+6 to find another factor.

$$\begin{array}{r|rrrr} -6 & 1 & 5 & -18 & -72 \\ & & -6 & 6 & +72 \\ \hline & 1 & -1 & -12 & 0 \end{array}$$

x^2-x-12 FACTOR THIS TO FIND Remaining FACTORS.

$+3 \times -4$, -12, -1 $\quad (x-4)(x+3)$

THE 3 FACTORS ARE: $(x+6)(x-4)(x+3)$

You can now finish Hwk #26

Sec 6-3

Due Monday

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Problems: 15, 16, 18, 19, 23, 49, 50, 53

You are now ready for Quiz #3