Find this quotient. $\dfrac{2x^4 + 6x^3 + 3x^2 + 30x - 32}{x^2 + 5}$

Any time there is a missing term in either the dividend or divisor the division is made easier by placing a zero in place of the missing term.

$$x^2 + 0x + 5 \;\overline{)\; 2x^4 + 6x^3 + 3x^2 + 30x - 32}$$

$2x^2 + 6x - 7$

$-(2x^4 + 0x^3 + 10x^2)$

$6x^3 - 7x^2 + 30x$

$-(6x^3 + 0x^2 + 30x)$

$-7x^2 + 0x - 32$

$-(-7x^2 + 0x - 35)$

3

ANS: $2x^2 + 6x - 7 \quad R = 3$

Find this quotient. $\dfrac{2x^4 + x^3 - 27x^2 + 44x - 15}{x^2 + 3x - 7}$

$$x^2 + 3x - 7 \;\overline{)\; 2x^4 + x^3 - 27x^2 + 44x - 15}$$

$2x^2 - 5x + 2$

$-(2x^4 + 6x^3 - 14x^2)$

$-5x^3 - 13x^2 + 44x$

$-(-5x^3 - 15x^2 + 35x)$

$2x^2 + 9x - 15$

$-(2x^2 + 6x - 14)$

$3x - 1$

In polynomial division the largest remainder you can get is a degree that is one less than the divisor.

ANS: $2x^2 - 5x + 2 \quad R = 3x - 1$

Is $x + 4$ a factor of $2x^3 - 12x^2 + 8x - 20$

What must be true for a number to be a factor of another number?

There must be NO remainder when you find their quotient.

$$x + 4 \;\overline{)\; 2x^3 - 12x^2 + 8x - 20}$$

$2x^2 - 20x + 88$

$-(2x^3 + 8x^2)$

$-20x^2 + 8x$

$-(-20x^2 - 80x)$

$88x - 20$

$-(88x + 352)$

-372

$x+4$ is NOT a factor because the remainder isn't zero

You can now finish Hwk #25 Sec 6-3

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Due tomorrow

Problems 3-5, 8-10, 38

Now for some **FAKE** division.

Synthetic

1. (of a substance) made by chemical synthesis, especially to imitate a natural product.
   "synthetic rubber"
   synonyms: synthetic · fake · false · imitation · mock · simulated · faux · ersatz · [more]

Natural (*From Nature*)	Synthetic (*Man-Made*)
• Fuel- Coal 	• Fuel- Syngas 
• Fiber- Cotton 	• Fiber- Nylon 

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

Multiply and ADD

	1	-2	-31	20
		+ −5	+ 35	+ −20
Bring down the first #	1 x -5	−7 x -5	+4 x -5	0
	=	=	=	=

these represent the coefficients, constant, & remainder of the answer

ANS: $1x^2 - 7x + 4$ R = 0

2. $\dfrac{2x^4 + 18x^3 + 34x^2 + 43x + 10}{x + 7}$

−7	2	18	34	43	10
		−14	−28	−42	−7
	2	4	6	1	3

$2x^3 + 4x^2 + 6x + 1 \quad R = 3$