Lesson Title 4.3 Dividing Polynomial Functions Notes ALG 2 Date _____

Long Division

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

$2x^2 - 6x + 9$ R. -21

$2x+3 \overline{)\,4x^3 - 6x^2 + 0x + 6}$

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

$-12x^2 + 0x$

$-(-12x^2 - 18x)$

$18x + 6$

$-(18x + 27)$

-21

$(12x^4 - 11x^2 + 10) \div (3x^2 + 1)$

$4x^2 - 5$

$3x^2 + 0x + 1 \overline{)\,12x^4 + 0x^3 - 11x^2 + 0x + 10}$

$-(12x^4 + 0x^3 + 4x^2)$

$-15x^2 + 0x + 10$

$-(-15x^2 + 0x - 5)$

15

$4x^2 - 5$ R. 15

$x + 2$

$x+3 \overline{)\,x^2 + 5x - 7}$

$-(x^2 + 3x)$

$2x - 7$

$-(2x + 6)$

-13

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

Synthetic Division

In synthetic division, the degree of the quotient is always one less than the degree of the divisor. Replace missing terms with zeros!!

$x+3 \overline{)\,x^2 + 5x - 7}$

-3	1	5	-7
+		-3	-6
	1	2	-13

$x + 2$ R. -13

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

-3	2	0	-1	-7
+		-6	18	-51
	2	-6	17	-58

$2x^2 - 6x + 17$ R -58

$x-1 \overline{)\,2x^3 - 6x + 5}$

1	2	0	-6	5
+		2	2	-4
	2	2	-4	1

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

Synthetic Substitution

In synthetic substitution, you plug in the value of x provided to all x's in the function. Your answer is a coordinate. Be sure to show the set-up to earn full credit, but use your calculator to get the answer.

$P(x) = 2x^4 - 3x^3 + 4x^2 - 5x + 1$, find $P(2)$.

$P(2) = 2(2)^4 - 3(2)^3 + 4(2)^2 - 5(2) + 1$

$P(2) = 15$

$(2, 15)$

$F(x) = x^4 - 3x^2 + 4x - 5$, find $F(-2)$

$F(-2) = (-2)^4 - 3(-2)^2 + 4(-2) - 5$

$F(-2) = -9$

$(-2, -9)$

Notes to yourself about what you struggled with so you don't make the same mistake again!!!

- Don't forget the zeros as placeholders
- Show work!

Still need help with: