2.3 Polynomial Operations:

Notes Key

Addition and Subtraction:

$(2x^2 - 3) - 2(4x^2 + 3x - 1)$

$2x^2 - 3 - 8x^2 - 6x + 2 = -6x^2 - 6x - 1$

Multiplication

$(2x + 5)(x^2 - 3x + 1)$

$2x^3 - 6x^2 + 2x + 5x^2 - 15x + 5$

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

$(2x + 3)^2$

$(2x+3)(2x+3)$

$4x^2 + 6x + 6x + 9$

$4x^2 + 12x + 9$

Long Division

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

$x^2 + 0x + 1$) $x^3 + 2x^2 - 3x + 1$

$+0x$

$x + 2$

$\ominus\ x^3 + 0x^2 + 1x$ ↓

$2x^2 - 4x + 1$

$\ominus\ 2x^2 + 0x + 2$

$-4x - 1$ R

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

Divisor must be LINEAR!

Synthetic Division

$(x^3 + 2x - 3) \div (x - 3)$ (to x^2) Root = 3

3	1	0	2	-3
+	↓	3	9	33
	1	3	11	30 R
	x^2	x		

$$x^2 + 3x + 11 + \frac{30}{x-3}$$

$$\frac{2x^3 - 15x^2 + 27x - 10}{2x - 1}$$ Root = $\frac{1}{2}$

$\frac{1}{2}$	2	-15	27	-10
+	↓	1	-7	10
	2	-14	20	0 R
	x^2	x		

$$2x^2 - 14x + 20$$