

7.5 NOTES – LONG DIVISION OF POLYNOMIALS

OBJECTIVES:

- 1) Divide polynomial expressions using long division.

QUICKLY DIVIDE:

1) $\frac{4892}{4}$

$$4 \overline{) 4892} \begin{array}{r} 1223 \\ \underline{4892} \\ 0 \end{array}$$

2) $\frac{1024}{3}$

$$3 \overline{) 1024} \begin{array}{r} 341 \text{ R } 1 \\ \underline{-9} \\ 12 \\ \underline{-12} \\ 04 \\ \underline{-3} \\ 1 \end{array} \quad \boxed{341 \frac{1}{3}}$$

3) $\frac{3x^3 - 2x^2 - 13x + 14}{x - 2}$

$$x-2 \overline{) 3x^3 - 2x^2 - 13x + 14} \begin{array}{r} 3x^2 + 4x - 5 \text{ R } 4 \\ \underline{-(3x^3 - 6x^2)} \\ 4x^2 - 13x \\ \underline{-(4x^2 - 8x)} \\ -5x + 14 \\ \underline{-(-5x + 10)} \\ 4 \end{array}$$

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

4) $\frac{4x^3 + 10x^2 - 12x - 30}{2x + 3}$

$$2x+3 \overline{) 4x^3 + 10x^2 - 12x - 30} \begin{array}{r} 2x^2 + 2x - 9 \text{ R } -3 \\ \underline{-(4x^3 + 6x^2)} \\ 4x^2 - 12x \\ \underline{-(4x^2 + 6x)} \\ -18x - 30 \\ \underline{-(-18x - 27)} \\ -3 \end{array}$$

$$\boxed{2x^2 + 2x - 9 - \frac{3}{2x+3}}$$

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

$$x^2+0x+3 \overline{) x^3 + 5x^2 - 2x + 4} \begin{array}{r} x+5 \text{ R } -5x-11 \\ \underline{-(x^3 + 0x^2 + 3x)} \\ 5x^2 - 5x + 4 \\ \underline{-(5x^2 + 0x + 15)} \\ -5x - 11 \end{array}$$

$$\boxed{x + 5 - \frac{5x+11}{x^2+3}}$$

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

$$x^2-x+1 \overline{) x^4 + 0x^3 + x^2 + 0x + 1} \begin{array}{r} x^2 + x + 1 \\ \underline{-(x^4 - x^3 + x^2)} \\ x^3 + 0x^2 + 0x \\ \underline{-(x^3 - x^2 + x)} \\ x^2 - x + 1 \\ \underline{-(x^2 - x + 1)} \\ 0 \end{array}$$

$$\boxed{x^2 + x + 1}$$