

Date: _____

3.3 Polynomial Division**Polynomial $\div$ Monomial (recall from Math 9)**

Ex.

$$\frac{4x+2}{2}$$

* turn into a series of monomial/monomial divisions

$$\left[\begin{aligned} &= \frac{4x}{2} + \frac{2}{2} \\ &= \boxed{2x + 1} \end{aligned} \right.$$

$$\text{Ex. } \frac{6x^3 - 12x^2}{3x}$$

$$\begin{aligned} &= \frac{6x^3}{3x} - \frac{12x^2}{3x} \\ &= \boxed{2x^2 - 4x} \end{aligned}$$

$$\text{Ex. } \frac{15x^3y^2 - 10xy^4 + 25x^4y^3}{-5xy^2}$$

$$= \boxed{-3x^2 + 2y^2 - 5x^3y}$$

Polynomial $\div$ Binomial (Long Division)

Recall from grade ???

Ex. Solve by long division: $612 \div 5$

$$\begin{array}{r} 122 \leftarrow \text{quotient} \\ \boxed{5} \overline{) 612} \leftarrow \text{dividend} \\ \underline{-5} \\ 11 \\ \underline{-10} \\ 12 \\ \underline{-10} \\ 2 \end{array}$$

(2) remainder

$$\text{*note: } \frac{\text{dividend}}{\text{divisor}} = \text{quotient} + \frac{\text{remainder}}{\text{divisor}}$$

$$\frac{612}{5} = 122 + \frac{2}{5}$$

Similar for polynomial division:

Ex. Solve:

$$6x^2 + 7x + 9 \div 2x + 1 = 3x + 2 + \frac{7}{2x+1}$$

$$\begin{array}{r} 3x+2 \\ \boxed{2x+1} \overline{) 6x^2+7x+9} \\ \underline{6x^2+3x} \downarrow \\ 4x+9 \\ \underline{4x+2} \\ 7 \end{array}$$

quotient $3x+2$
remainder 7

$$-3x + 5 + x^2 \div x - 2 \quad \begin{array}{r} -3 \\ + (+2) \\ \hline -1 \end{array}$$

$$\begin{array}{r} x-1 \\ x-2 \overline{) x^2-3x+5} \\ \underline{x^2-2x} \downarrow \\ -1x+5 \\ \underline{-x+2} \\ 3 \end{array}$$

← dividend
in descending
order

$$= x-1 + \frac{3}{x-2}$$

$$8x^2 + 11 - 6x \div 2x - 3$$

$$\begin{array}{r} 4x+3 \\ \underline{2x-3} \overline{) 8x^2-6x+11} \\ \underline{8x^2-12x} \downarrow \\ 6x+11 \\ \underline{6x-9} \\ 20 \end{array}$$

$$= 4x+3 + \frac{20}{2x-3}$$

$$9m^2 - 5 \div 3m + 2$$

$$\begin{array}{r} 3m-2 \\ \underline{3m+2} \overline{) 9m^2+0m-5} \\ \underline{9m^2+6m} \downarrow \\ -6m-5 \\ \underline{-6m-4} \\ -1 \end{array}$$

$$= 3m-2 + \frac{-1}{3m+2}$$

Practice: Worksheet (B-25/C-13)/ work on separate sheet