

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

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

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

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

$$= \frac{6x^3}{3x} - \frac{12x^2}{3x}$$

$$= 2x^2 - 4x$$

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

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

Polynomial $\div$ Binomial (Long Division)

Recall from grade ???

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

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

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

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

Similar for polynomial division:

$$\underline{3x(2x+1)}$$

Ex. Solve:

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

$$(-3x + 5 + x^2) \div (x - 2)$$

$$2x+1 \overline{) 6x^2 + 7x + 9}$$

$$\underline{- 6x^2 + 3x} \downarrow$$

$$4x + 9$$

$$\underline{- 4x + 2}$$

$$7$$

quotient $3x+2$
remainder 7

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

$$\underline{- x^2 + 2x} \downarrow$$

$$-x + 5$$

$$\underline{- (-x + 2)}$$

$$3$$

$\leftarrow$ dividend in descending order

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

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

$$4x+3$$

$$2x-3 \overline{) 8x^2 - 6x + 11}$$

$$\underline{- 8x^2 + 12x} \downarrow$$

$$6x + 11$$

$$\underline{- 6x + 9}$$

$$20$$

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

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

$$3m-2$$

$$3m+2 \overline{) 9m^2 + 0m - 5}$$

$$\underline{- 9m^2 + 6m}$$

$$-6m - 5$$

$$\underline{- -6m - 4}$$

$$-1$$

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

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