

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Review! Dividing by a MONOMIAL	1. $\frac{6x^4 - 15x^3 + 3x^2}{3x^2}$ $2x^2 - 5x + 1$	2. $\frac{21a^5b^3 - 14a^3b^2 + 63a^2b}{7ab}$ $3a^4b^2 - 2a^2b + 9a$
New! Dividing by a BINOMIAL	Directions: Use factoring to divide the polynomials below.	
	3. $\frac{w^2 - 7w + 10}{w - 5}$ $\frac{(w-5)(w-2)}{w-5}$ $w-2$	4. $(4h^2 - 7h - 2) \div (h - 2)$ $\frac{(4h+1)(h-2)}{h-2}$ $4h+1$

WHAT IF FACTORING IS NOT POSSIBLE??

Method 1: Long Division	Method 2: Synthetic Division
5. $(x^2 + 3x - 43) \div (x + 8)$ $\begin{array}{r} x - 5 \\ x+8 \overline{) x^2 + 3x - 43} \\ \underline{-(x^2 + 8x)} \\ -5x - 43 \\ \underline{-(-5x - 40)} \\ -3 \end{array}$ (-3) Remainder $x - 5 - \frac{3}{x+8}$	6. $(x^2 + 3x - 43) \div (x + 8)$ $\begin{array}{r rrr} & 1 & 3 & -43 \\ -8 & & -8 & 40 \\ \hline & 1 & -5 & -3 \end{array}$ $x - 5 - \frac{3}{x+8}$

Directions: Use long or synthetic division to divide the polynomials below.

7. $(2n^2 - 16n + 19) \div (n - 7)$

$$\begin{array}{r} n-7 \overline{) 2n^2 - 16n + 19} \\ \underline{-(2n^2 - 14n)} \\ -2n + 19 \\ \underline{-(-2n + 14)} \\ 5 \end{array}$$

$$\boxed{2n - 2 + \frac{5}{n-7}}$$

$$\begin{array}{r|rrrr} 7 & 2 & -16 & 19 & \\ & \downarrow & 14 & -14 & \\ \hline & 2 & -2 & 5 & \end{array}$$

8. $(y^3 + 5y^2 - 7y + 2) \div (y - 2)$

$$\begin{array}{r} y-2 \overline{) y^3 + 5y^2 - 7y + 2} \\ \underline{-(y^3 - 2y^2)} \\ 7y^2 - 7y \\ \underline{-(7y^2 - 14y)} \\ 7y + 2 \\ \underline{-(7y - 14)} \\ 16 \end{array}$$

$$\boxed{y^2 + 7y + 7 + \frac{16}{y-2}}$$

$$\begin{array}{r|rrrr} 2 & 1 & 5 & -7 & 2 \\ & \downarrow & 2 & 14 & 14 \\ \hline & 1 & 7 & 7 & 16 \end{array}$$

Missing Powers
in the Dividend

★ Add in
any missing
powers with
zeros as
placeholders! ★

9. $(k^3 - 17k + 32) \div (k + 5)$

$$\begin{array}{r} k+5 \overline{) k^3 + 0k^2 - 17k + 32} \\ \underline{-(k^3 + 5k^2)} \\ -5k^2 - 17k \\ \underline{-(-5k^2 - 25k)} \\ 8k + 32 \\ \underline{-(8k + 40)} \\ -8 \end{array}$$

$$\begin{array}{r|rrrr} -5 & 1 & 0 & -17 & 32 \\ & \downarrow & -5 & 25 & -40 \\ \hline & 1 & -5 & 8 & -8 \end{array}$$

$$\boxed{X^2 - 5X + 8 - \frac{8}{X+5}}$$

10. $(8x^4 - 64x^3 + 3x - 28) \div (x - 8)$

$$\begin{array}{r} 8 \overline{) 8x^4 - 64x^3 + 0x^2 + 3x - 28} \\ \underline{-(8x^4 - 64x^3)} \\ 0x^2 + 3x - 28 \\ \underline{-(0x^2 - 24x + 192)} \\ 24x - 220 \end{array}$$

$$\boxed{8x^3 + 3 - \frac{4}{x-8}}$$