

Day 63

6.3 Long Division of Polynomials

$$\begin{array}{r} 5 \overset{2}{\cancel{6}} \\ 6 \overline{)32} \\ \underline{-30} \\ 2 \end{array}$$

$$\left(5 \frac{1}{3} \right)$$

$$\begin{array}{r} \textcircled{248} \\ 27 \overline{)6696} \\ \underline{-54} \downarrow \\ 129 \\ \underline{-108} \downarrow \\ 216 \\ \underline{-216} \\ 0 \end{array}$$

- REPEAT
1. $\overset{\circ}{\div}$
 2. multiply
 3. subtract
 4. drop down #

$$\textcircled{1} \frac{x^2 + 3x - 12}{x - 2}$$

OR $(x^2 + 3x - 12) \div (x - 2)$
 dividend divisor

STEPS:

1st: Divide the 1st term on the inside by the term on the outside

$$\frac{x^2}{x} = x(x - 2)$$

Answer $\rightarrow \left(x + 5 + \frac{-2}{x-2} \right)$

$$\begin{array}{r} (x-2) \overline{)x^2 + 3x - 12} \\ \underline{-x^2 + 2x} \downarrow \\ 5x - 12 \\ \underline{-5x + 10} \\ -2 \\ \uparrow \\ \text{remainder} \end{array}$$

$$\frac{5x}{x} = 5(x - 2)$$

2nd: Multiply the answer by the divisor

3rd: SUBTRACT
 "change the signs"

4th: Drop down next term
 + REPEAT

IF degree is bigger or the same as the divisor

④ Divide $x^3 - 8$ by $x - 2$

$$x^2 + 2x + 4$$

$$\begin{array}{r} x-2 \overline{) x^3 + 0x^2 + 0x - 8} \\ \underline{-x^3 + 2x^2} \\ 2x^2 + 0x \\ \underline{-2x^2 + 4x} \\ 4x - 8 \\ \underline{-4x + 8} \\ 0 \end{array}$$

$\frac{x^3}{x} = x(x-2)$

$\frac{2x^2}{x} = 2x(x-2)$

$\frac{4x}{x} = 4(x-2)$

Name _____ Period _____

LONG DIVISION

6.3 Dividing Polynomials

Divide each polynomial expression. Check your answer.

Example: $\frac{4x^2 - 2x + 6}{2x - 3}$

$$\begin{array}{r}
 2x + 2 \\
 2x - 3 \overline{) 4x^2 - 2x + 6} \\
 \underline{-4x^2 + 6x} \\
 4x + 6 \\
 \underline{-4x + 6} \\
 12 \text{ remainder}
 \end{array}$$

$$(2x + 2) + \frac{12}{2x - 3}$$

Check: $(2x + 2)(2x - 3) + 12$
 $4x^2 - 2x - 6 + 12 = 4x^2 - 2x + 6$

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

2. $(4x^4 + 5) \div (x^2 + 1)$

3. $\frac{x^2 - 3x - 7}{x + 2}$

4. $(x^3 - 6) \div (x - 1)$

5. $(x^3 - 6x^2 + 1) \div (x + 2)$

6. $\frac{2x^4 + 2x^3 - 10x - 9}{x^3 + x^2 - 5}$

7. $\frac{10x^3 + 27x^2 + 14x + 5}{x^2 + 2x}$

8. $\frac{6x^2 - x - 7}{3x + 1}$