Name: **Key**  Hour: _____  Date: _____

## Polynomial Long Division Notes

Let's review the kinds of polynomial long division problems that we solved at the end of the hour on Friday...

1) $(x^2 + 7x + 6) \div (x + 6)$

$$
\begin{array}{r}
x + 1 \\
x+6 \overline{\smash)x^2 + 7x + 6} \\
-(x^2 + 6x) \\
\hline
1x + 6 \\
-(1x + 6) \\
\hline
0
\end{array}
$$

$\boxed{x + 1}$

2) $(x^2 - 9x + 20) \div (x - 4)$

$$
\begin{array}{r}
x - 5 \\
x-4 \overline{\smash)x^2 - 9x + 20} \\
-(x^2 - 4x) \\
\hline
-5x + 20 \\
-(-5x + 20) \\
\hline
0
\end{array}
$$

$\boxed{x - 5}$

All of the problems that we've seen so far do not have any remainders!

Let's look at some problems that have remainders!

<u>Example 1:</u> $(x^2 + 8x - 20) \div (x + 3)$

$$
\begin{array}{r}
x + 5 \\
x+3 \overline{\smash)x^2 + 8x - 20} \\
-(x^2 + 3x) \\
\hline
5x - 20 \\
-(5x + 15) \\
\hline
-35
\end{array}
$$

$\boxed{x + 5 - \dfrac{35}{x+3}}$

<u>Example 2:</u> $(x^2 - 14x + 24) \div (x - 4)$

$$
\begin{array}{r}
x - 10 \\
x-4 \overline{\smash)x^2 - 14x + 24} \\
-(x^2 - 4x) \\
\hline
-10x + 24 \\
-(-10x + 40) \\
\hline
-16
\end{array}
$$

$\boxed{x - 10 - \dfrac{16}{x-4}}$