Polynomial and Rational Functions                Name ___________________________
A2RCC U8D7 Homework


1) Divide the polynomials.

a) Simplify $\frac{2x^2+15x+18}{x+6}$ by performing polynomial long division.

b) Rewrite the result as an equivalent multiplication equation.

2) Write $\frac{2x^2+15x+20}{x+6}$ in the form $q(x)+\frac{r}{(x+6)}$, where $q(x)$ is a polynomial and $r$ is a constant, by performing polynomial long division. Also, write the result an equivalent multiplication equation.

So, when we divide two polynomials, we always get another polynomial and a remainder. This is known as writing the rational expression in **quotient-remainder form.**

***Exercise* #3:** Write each of the following rational expressions in the form $q(x)+\frac{r}{(x-a)}$ form.

(a) $\frac{x^2+2x-5}{x-3}$

(b) $\frac{2x^2-23x+17}{x-10}$

Sometimes we can use the structure of an expression instead of polynomial long division.

***Exercise* #4:** Consider the expression $\frac{x+8}{x+3}$. We would like to write this as $a+\frac{b}{x+3}$.

(a) Write the numerator as an equivalent expression involving the expression $x+3$.

(b) Use the fact that division distributes over addition to write the final answer.

We can extend what we did in the last problem to more challenging structure problems.

***Exercise* #5:** Write each of the following in the form of $a+\frac{b}{x-r}$.

(a) $\frac{4x+13}{x+2}$

(b) $\frac{3x-5}{x-4}$

6) Divide and express in quotient-remainder form.

$a$) $(x^3+7x^2+14x+3)\div(x+2)$

b) $(x^3-10x^2-20x+26)\div(x-5)$