Name_____ Date_____ Period_____

REMAINDER THEOREM/FACTOR THEOREM WORKSHEET

Remainder Theorem:
When a polynomial $f(x)$ is divided by $x-a$, the remainder is $f(a)$

1. Find the remainder when $2x^3+3x^2-17x-30$ is divided by each of the following:

   (a) $x-1$ (b) $x-2$ (c) $x-3$

   (d) $x+1$ (e) $x+2$ (f) $x+3$

Factor Theorem:
If $x=a$ is substituted into a polynomial for x, and the remainder is 0, then $x-a$ is a factor of the polynomial.

2. Using the above Theorem and your results from question 1 which of the given binomials are factors of $2x^3+3x^2-17x-30$?

3. Using the binomials you determined were factors of $2x^3+3x^2-17x-30$, complete the division (i.e. divide $2x^3+3x^2-17x-30$ by your chosen ($x-a$) and remember to fully factor your result in each case.

4. Without using long division, find each remainder:

(a) $(2x^2+6x+8)\div(x+1)$ (b) $(x^2+4x+12)\div(x-4)$

(c) $(x^3+6x^2-4x+3)\div(x+2)$ (d) $(3x^3+7x^2-2x-11)\div(x-2)$

5. Use synthetic division to find each remainder:

(a) $(2x^2+x-6)\div(x+2)$ (b) $(x^3+6x^2-4x+2)\div(x+1)$

(c) $(x^3+x^2-12x-13)\div(x-2)$ (d) $(x^4-x^3-3x^2+4x+2)\div(x+2)$

6. When x^3+kx^2-4x+2 is divided by $x+2$ the remainder is 26, find *k*.

7. When $2x^3-3x^2+kx-1$ is divided by $x-1$ the remainder is 2, find *k*.