Geom 1-2 (E)
Algebra Review - Part 3

Name: _____

Period: ____

Bottoms Up Method of Factoring

Basic Trinomial (ax^2+bx+c) **with** $a \neq 1$

Example A: $3x^2+10x+8$

Step 1: Factor out any common terms

No common terms

Step 2: Multiply "a" and "c"

$3 \cdot 8 = 24$

Step 3: **Look for all pairs of factors for this number**
(Remember if the number is negative, you will have to look at each set with one number positive and one number negative)

24: **(1,24)** **(2, 12)** **(3,8)** **(4,6)**

Step 4: Choose pair of numbers whose sum will = "b" term

$4+6=10$

Step 5: Use this pair to write "preliminary" factors

$(x+4)(x+6)$

Step 6: Divide the numbers by the leading coefficient.

$\left(x+\frac{4}{3}\right)\left(x+\frac{6}{3}\right)$

Step 7: If the numbers divide "evenly" (resulting in an integer) then this is the factor. If the numbers do NOT divide evenly, then pull the divisor up to be the leading coefficient of the x term:

$(3x+4)(x+2)$ done!!!

Factor and solve.

1.) $2x^2-3x-5=0$

$2 \cdot 5 = 10$

10

1, 10

2, 5

$(x-5)(x+2)$

$\left(x-\frac{5}{2}\right)(x+1)$

$(2x-5)(x+1)=0$

$x=\frac{5}{2}, -1$

2.) $2a^2+3a-20=0$

$2 \cdot 20 = 40$

40

1, 40

2, 20

4, 10

5, 8

$(x+8)(x-5)$

$(x+4)\left(x-\frac{5}{2}\right)$

$(x+4)(2x-5)=0$

$x=-4, \frac{5}{2}$

3.) $5m^2+13m=6$

$5m^2+13m-6=0$

$5 \cdot 6 = 30$

30

1, 30

2, 15

3, 10

5, 6

$(m+15)(m-2)$

$(m+3)\left(m-\frac{2}{5}\right)$

$(m+3)(5m-2)=0$

$m=-3, \frac{2}{5}$

4.) $8x^2+21=-59x$

$8x^2+59x+21=0$

$8 \cdot 21 = 168$

168

1, 168

2, 84

3, 56

$(x+3)(x+56)$

$\left(x+\frac{3}{8}\right)(x+7)$

$(8x+3)(x+7)=0$

$x=-\frac{3}{8}, -7$

5.) $4b^2+8b+7=4$

$4b^2+8b+3=0$

$4\cdot 3=12$

$\frac{12}{1,12}$

$2,6$

$3,4$

$(b+2)(b+6)$

$(b+\frac{1}{2})(b+\frac{3}{2})$

$(2b+1)(2b+3)=0$

$b=-\frac{1}{2},-\frac{3}{2}$

6.) $20w^2-23w+6=0$

$20\cdot 6=120$

$\frac{120}{1,120}$

$2,60$

$3,40$

$4,30$

$5,24$

$6,20$

$8,15$

$(w-8)(w-15)$

$(w-\frac{2}{5})(w-\frac{3}{4})$

$(5w-2)(4w-3)=0$

$w=\frac{2}{5},\frac{3}{4}$

Solve the systems of equations using the method listed. Express your answer as an ordered pair (x,y).

7.) $\begin{matrix} x+y=17 \\ x-y=5 \end{matrix}$ (Elimination)

$2x=22$

$x=11$

$11+y=17$

$y=6$

$(11,6)$

8.) $\begin{matrix} 2x+7y=-3 \\ 5x-y=11 \end{matrix}$ (Substitution)

$y=5x-11$

$2x+7(5x-11)=-3$

$2x+35x-77=-7$

$37x=74$

$x=2$

$2(2)+7y=-3$

$7y=-7$

$y=-1$

$(2,-1)$

9.) $\begin{matrix} x+y=90 \\ 4x+y=180 \end{matrix}$ (Substitution)

$y=90-x$

$4x+90-x=180$

$3x=90$

$x=30$

$30+y=90$

$y=60$

$(30,60)$

10.) $\begin{matrix} 4x-5y=20 \\ 3x+2y=38 \end{matrix}$ (Elimination) $\cdot 2$ $\cdot 5$

$8x-10y=40$

$15x+10y=190$

$23x=230$

$x=10$

$3(10)+2y=38$

$2y=8$

$y=4$

$(10,4)$