SO YOU THINK YOU CAN FACTOR! NAME _____

Factor the following quadratic trinomials

1. $15x^2+121x+8$ _____

2. $15x^2-29x+8$ _____

3. $15x^2+43x+8$ _____

4. $15x^2-14x-8$ _____

5. $15x^2-19x-8$ _____

6. $15x^2+119x-8$ _____

7. $15x^2+26x-8$ _____

8. $15x^2-26x+8$ _____

9. $15x^2-2x-8$ _____

10. $15x^2+37x-8$ _____

11. $15x^2-34x+8$ _____

12. $15x^2+22x+8$ _____

A LITTLE EXPLORATION NAME_____

Select a variety of positive integer values for $m$ and $n$ with $m > n$ and fill in the chart below. Look at the values you get. Is there any sort of pattern? What are these sets of numbers? Can you prove it?

| $m$ | $n$ | $m^2 - n^2$ | $2mn$ | $m^2 + n^2$ |
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Now check out these sets of values. Is there any sort of interesting relationship/pattern? Can you find any other sets?

$1, 2, 2, 3$

$1, 4, 8, 9$

$2, 3, 6, 7$

$2, 6, 9, 11$

$3, 4, 12, 13$

$6, 6, 7, 11$

ASYMPTOTES VERSUS HOLES NAME_____

Use your grapher (set the *x*-min value to -4.7 and the *x*-max value to 4.7) to investigate the graphs of the following rational functions. At which values for *x* do you expect to find vertical asymptotes? Why? Why do some of the *x*-values at which you would expect to see an asymptote fail to have this feature? What peculiar graphical occurrence do you find there?

1. $f(x)=\frac{x^2+1}{x+1}$

2. $f(x)=\frac{x+1}{x^2-1}$

3. $f(x)=\frac{x^2-1}{x+1}$

4. $f(x)=\frac{x^3+1}{x+1}$

5. $f(x)=\frac{x+1}{x^2-1}$

6. $f(x)=\frac{x^3-1}{x^2-1}$

7. $f(x)=\frac{x-1}{x^2-1}$

8. $f(x)=\frac{x^3+1}{x^2-1}$

9. $f(x)=\frac{x^2-1}{x-1}$

10. $f(x)=\frac{x^3-1}{x-1}$

11. $f(x)=\frac{x^2-1}{x^2+1}$

SO YOU THINK YOU CAN SOLVE SYSTEMS OF EQUATIONS!

Solve for $\{(x,y)\}$ in each of the following systems. Give a complete set of ordered pairs that form the solution. In some of these you should try to find a "clever" approach.

1. $\frac{9}{2x}+\frac{10}{3y}=1\frac{5}{12}$
   $\frac{7}{2x}-\frac{5}{3y}=\frac{1}{4}$

2. $\frac{3}{2x}+\frac{1}{y}=\frac{13}{12}$
   $\frac{1}{3x}-\frac{4}{3y}=-\frac{5}{18}$

3. $ax=6y-8$
   $by=x+1$

4. $mx+ny=m^2+n^2$
   $my-nx=m^2+n^2$

5. $\frac{x-1}{3}-\frac{y-2}{4}=1$
   $\frac{x-2}{4}+\frac{y-1}{3}=2$

6. $\frac{2x+y+5}{7x+6y}=\frac{1}{6}$
   $\frac{x+y-2}{2y-x+4}=\frac{1}{8}$

7. $x-2y=12$
   $xy=-10$

8. $5x^2-y^2=3$
   $x^2+2y^2=5$