To The Students:

Gold Medal problems present you with an opportunity to investigate complex, interesting problems over several days. The purpose is to focus on the process of solving complex problems. **You will be evaluated on your ability to show, explain, and justify your work and thoughts.** Save all your work, including what does not work in order to write about the processes you used to reach your answer.

Completion of a Gold Medal Problem includes four parts:

- **Problem Statement:** State the problem clearly in your own words so that anyone reading your paper will understand the problem you intend to solve.

- **Process and Solutions:** Describe in detail your thinking and reasoning as you worked from start to finish. Explain your solution and how you know it is correct. Add diagrams when it helps your explanation. Include things that did not work and changes you made along the way. If you did not complete this problem, describe what you do know and where and why you are stuck.

- **Reflection:** Reflect on your learning and your reaction to the problem. What mathematics did you learn from it? What did you learn about your math problem solving strategies? Is this problem similar to any other problems you have done before? If yes, how?

- **Attached work:** Include all your work and notes. Your scratch work is important because it is a record of your thinking. Do not throw anything away.
GM-1. GOING BANANAS!

Cleopatra ("Cleo") the Camel works for the owner of a small, remote banana plantation. This year’s harvest consists of three thousand bananas. Cleo can carry up to one thousand bananas at a time. The market place where the bananas are sold is one thousand miles away. Unfortunately, Cleo eats one banana each and every mile she walks.

Your Task:

Of the three thousand bananas harvested, what is the largest number of bananas Cleo can get to market?

P.S. This problem is not impossible!
GM-2.  RUMORS, RUMORS, RUMORS!

Part 1

Burton High School has 1,500 students. During first period, a rumor is started when Susan tells three friends a secret. Each of Susan’s three friends tell three of their friends during second period, who in turn tell three different friends during third period. Assume each person tells the rumor to only three others.

Part 2

In an attempt to discredit the President, a member of the opposite political party wishes to start a scandalous rumor about him. He plans to tell people this rumor one week before election day and wants the entire population of the United States (that’s 250,000,000 people!) to know the rumor. He needs to figure out how many people he should tell (and they each will tell the same number of people) so that everyone will have heard the rumor by the seventh day.

Your Task:

• Find the number of students who have heard the rumor at the end of the day. (Burton has 6 periods.)

• Find the number of people the evil politician needs to tell so everyone in the United States will have heard the rumor by the seventh day. Remember: each person needs to tell the same number of people.
GM-3. GRAPHING MADNESS

On graph paper starting at (0,0), carry out the following moves:

<table>
<thead>
<tr>
<th>Move Number</th>
<th>Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right 1 unit</td>
</tr>
<tr>
<td>2</td>
<td>Up 2 units</td>
</tr>
<tr>
<td>3</td>
<td>Left 3 units</td>
</tr>
<tr>
<td>4</td>
<td>Down 4 units</td>
</tr>
<tr>
<td>5</td>
<td>Right 5 units</td>
</tr>
</tbody>
</table>

Continue moving counter clockwise using this pattern.

Your Task:

- There are visual patterns, as well as quadrant, coordinate, and move patterns. Describe each of them.
- Name which quadrant the 79th move will be in. What will its coordinates be? How do you know this?
- For any move, name which quadrant it will be in and what its coordinates will be. Explain the method you are using.
GM-4. FIBONACCI RECTANGLES

The Fibonacci Numbers are the following sequence:

1, 1, 2, 3, 5, 8, 13, ...

Describe this sequence. Continue it until you have the first 15 Fibonacci numbers.

If the measures of the sides of a rectangle are consecutive Fibonacci numbers, it is called a “Fibonacci rectangle”.

Here are the first four Fibonacci rectangles:

1 1
2
3
5

The sum of the areas of the first two Fibonacci rectangles is 3 square units.

The sum of the first three Fibonacci rectangles is 9 square units.

When you find the sum of the areas of the first two Fibonacci rectangles, the first three Fibonacci rectangles, the first four Fibonacci rectangles, etc., a pattern exists between the area sums and the original Fibonacci numbers.

Your Task:

• Find the sums of the areas of the Fibonacci rectangles, starting with the first two, then the first three, up through the first 15 rectangles.

• Describe the pattern that exists between the area sums and the original Fibonacci sequence.
GM-5. TILING THE KITCHEN FLOOR

By using different sizes and shapes of tiles together, intricate geometric designs can be created. For example, using octagonal and square tiles, the popular design at right can be laid out.

Using a variety of tile shapes and sizes allows for creative designs like the layout at left, which combines squares, triangles, and parallelograms.

After visiting a tile shop, Susan has chosen three different tiles for her kitchen floor, but would like your help in creating a design. Although Susan can not make the above patterns with the tiles she selected, many designs are possible. Use the floor plan provided in problem KF-106 to create a design. Then decide how many of each tile to buy.

Your Task:

- Make an accurate scale drawing of the outside dimensions of the floor on graph paper. You can use as large a piece of graph paper as you want. Use the problem KF-106 resource page to get the dimensions and shape of the floor. Include your scale on the graph paper.
- Draw in the rectangular design of the 3 inch by 3 inch tiles one foot from the walls. Remember that this position is shown with the dotted line on the resource page.
- With your scale drawing, make a design using the three tiles Susan chose. Make the floor something you would enjoy owning. Use color and creativity that suits you.
- Create a shopping list for Susan’s trip to the tile store.
GM-6. MOVE OVER, FRANK LLOYD WRIGHT

Ms. Speedi wants to build her dream house and would like you to design it. According to local zoning laws, she is limited to a one-story house with a maximum area of 1,000 square feet. She also has some personal requirements for this house:

- There must be two bedrooms with a combined area of at least 250 square feet.
- There should be one bathroom.
- The living room cannot be smaller than 200 square feet.
- The kitchen must be at least 220 square feet.
- The building costs are cheaper when the entire structure is rectangular. Therefore, make the overall shape of Ms. Speedi’s house a rectangle.

Your Task:
- Create a blueprint of Ms. Speedi’s house. Be sure to not only work within Ms. Speedi’s requirements and the zoning law, but to also include elements essential to a house: a front and back door, windows, and interior doors. Add furniture if you like.
- Explain to Ms. Speedi the selling points of your design. What makes your design best? What assumptions did you make for your design? Did you need to make any difficult decisions?
GM-7. MAKING DECISIONS, Part One

Carlos wanted to get a part-time job to have extra money for the holidays. After reading the advertisement at right, he applied. His interview went well, and he was offered the job. He had to choose between the following two pay scales:

Pay Scale # 1

He would make $10 per minute.

Pay Scale # 2

On day # 1, he would earn a total of 1¢
On day # 2, he would earn a total of 2¢
On day # 3, he would earn a total of 4¢

Each day, his salary rate would double from the day before.

Your Task:

• Before starting the problem guess which pay scale Carlos chose. Explain why you think this.

• If November 24th is a Monday, and the store is closed on Thanksgiving (November 27th), compare how much he would make for each day he works until December 24th using both scales.

• If you had a job offer like this one, which pay scale would you choose? Why?

• What number of days could you work to make the other pay scale attractive?
GM-8.  MAKING DECISIONS, Part Two

Carlos loves his job, so you decided to answer the advertisement shown below.

You were hired and given a choice of the following two pay scales:

Pay Scale # 1

You would make $20 per second.

Pay Scale # 2

On day # 1, you would earn a total of 1¢
On day # 2, you would earn a total of 8¢
On day # 3, you would earn a total of 64¢

Each day, your salary rate would multiply by a factor of eight from the day before.

Your Task:

- Since this job fewer days, compare your daily earnings using each pay scale. Remember that December 6th is a Monday.
- Which job would you choose? Why?

Summary:

- Describe what you learned by analyzing all 4 of the pay scales?
- Did the calculator do anything unusual? If so, describe it and explain why you think it happened.
GM-9. LATISHA’S BIRTHDAY

Latisha’s birthday was last week. Since she wanted lots of presents, she had a party and invited 50 of her closest friends.

Unbeknownst to her, the friends got together and decided 50 presents were too many. Instead, they got 50 boxes and numbered them from 1 to 50. They put presents in some of the boxes but not all of them.

When it was time for Latisha to open her gifts, the friends arranged all 50 boxes in a row. They informed Latisha that if she followed the instructions below she would discover which boxes held gifts.

- First, she was to go down the line and open every box.
- Then starting with box # 2, she was to close # 2, # 4, # 6, etc. going down the line.
- Starting with box # 3, she was to change every third box (she opened the box if it was closed and closed the box if it was open).
- Starting with box # 4, she change every fourth box.
- Starting with box # 5, she change every fifth box.

She went through the line of boxes 50 times continuing the pattern. When she was done, the only boxes left open had a pattern. Latisha squealed with delight when she recognized the pattern. She then searched these boxes to find her presents.

Your Task:

- Which boxes contained gifts? Describe the pattern Latisha found.
- Explain why you think this pattern occurred.
- Latisha wished she had invited 200 people to her party so there would have been 200 boxes. Using the same directions, which boxes would contain gifts this time? Explain how you know.
- What is the probability she would find a gift with a present if there were 50 presents and she randomly opened one box? What is the probability she would find a gift if there were 200 presents and she randomly opened one box? Why are these probabilities different?
GM-10. SPINNING MADNESS

Raquel had two spinners. She spun both spinners at the same time and recorded which spinner landed on the highest number. Using the spinners at right, A usually won. Can you prove why?

She then found 3 blank spinners. She decided to use the numbers 1 through 9 putting a different number in each section. At first she set them up like this:

She quickly realized that A would always beat B and A would always beat C.

**Your Task:**

- Using the numbers 1 through 9 (putting a different number into each section), try to create three spinners so that A will usually win over B; B will usually win over C; and C will usually win over A. Explain why this is or is not possible.

- This time, use the numbers 1 through 15 (putting a different number into each section) to create three spinners where A will usually win over B; B will usually win over C; and C will usually win over A. Explain why this is or is not possible.

- Try it one more time, using the numbers 1 through 12. Explain why this is or is not possible.

- Summarize your findings.
GM-11. CONSECUTIVE SUMS

A consecutive sum is an adding sequence of consecutive whole numbers.

Examples:  
2 + 3  
8 + 9 + 10 + 11 + 12 + 13  
7 + 8 + 9 + 10  
x + (x + 1) + (x + 2)

Your Task:

• Write the first 35 counting numbers (1 through 35) with as many consecutive sums as possible. The number 15 can be written as 7 + 8 or 4 + 5 + 6 or 1 + 2 + 3 + 4 + 5. Make sure you organize your work in order to find patterns.

• Describe as many patterns as you find. Are there any numbers that have no consecutive sums? Are some numbers easier to find? Write as many generalizations as you can.

• Demonstrate why your patterns are always true (algebra can be useful here).

• Can you find all the consecutive sums possible for any given number? For example, can you write all the ways 91 or 64 or 200 can be written as consecutive sums? Explain completely.
GM-12. GOING IN CIRCLES

In the olden days before the “Lottery” or the “Big Spin”, there lived a very compassionate queen. She was very, very kind and very, very rich. In fact, she decided to share her wealth with some lucky people.

Once every year she would invite some of her subjects to a banquet dinner and choose one lucky winner who would be granted one wish. The chairs were numbered consecutively starting with number 1 and set up in order around a large circular table as shown at right.

After dessert, the court jester entered and, starting with chair number 1, followed this rule: he eliminated every other person in a clockwise rotation until only one person was left.

That person would be the lucky winner of the year and could ask the Queen for one wish.

For example, if twelve people were invited and seated around the table, the jester would eliminate them in the following order:

2, 4, 6, 8, 10, 12, 3, 7, 11, 5, 1

This would leave person number 9 the winner.

Your Task:

- When 12 people are invited, show why the lucky winner will be person number 9.
- Find the lucky winner for at least 20 different-sized groups of people. Describe any patterns you find.
- Using the patterns you found, tell where you would sit in order to be the lucky winner if you were one of 270 people invited to dinner. Explain why you think your answer makes sense.
GM-13. CROSSING OVER

Elizabeth, Brian, Dean, and Leslie want to cross a bridge. They all begin on the same side and have only 17 minutes to get everyone across to the other side.

To complicate matters, it is night and there is only one flashlight. A maximum of two people can cross at one time. Any party that crosses, either 1 or 2 people, must have the flashlight with them. The flashlight must be walked back and forth; it cannot be thrown.

Each student walks at a different speed. A pair must walk together at the rate of the slower student’s pace.

- **Elizabeth:** 1 minute to cross
- **Brian:** 2 minutes to cross.
- **Dean:** 5 minutes to cross.
- **Leslie:** 10 minutes to cross.

For example, if Elizabeth and Leslie walk across first, 10 minutes have elapsed when they get to the other side of the bridge. If Leslie returns across the bridge with the flashlight, a total of 20 minutes has passed, and you have failed the mission.

**Your Task:**

- How can they get everyone across in 17 minutes?
- Do you think this is a good question for a computer firm to ask future employees? Explain.
GM-14. MAKE A GRAPH

Anyone can become an artist by following graphing directions. For example, graph the following design:

\[
\begin{align*}
  y &= 2x + 8 & 0 \leq x \leq 2 \\
  y &= 12 & 2 \leq x \leq 4 \\
  y &= -x + 16 & 4 \leq x \leq 6 \\
  x &= 6 & 8 \leq y \leq 10 \\
  y &= \frac{4}{3}x & 0 \leq x \leq 6 \\
  y &= -\frac{4}{3}x & -6 \leq x \leq 0 \\
  x &= -6 & 8 \leq y \leq 10 \\
  y &= x + 16 & -6 \leq x \leq -4 \\
  y &= 12 & -4 \leq x \leq -2 \\
  y &= -2x + 8 & -2 \leq x \leq 0 
\end{align*}
\]

Your Task: Make a design on graph paper which can be drawn by someone following your equation instructions. Think about ways you can get curves in your design. Be creative, but accurate. Include your design on graph paper along with a listing of equations and domain (input) values like those shown above.
GM-15.  **WEIGHING PUMPKINS**

Every year at Half Moon Bay, there is a pumpkin contest to see who has grown the largest pumpkin for that year.

Last year, one pumpkin grower (who was also a mathematician) brought 5 pumpkins to the contest. Instead of weighing them one at a time, he informed the judges, “When I weighed them two at a time, I got the following weights: 110, 112, 113, 114, 115, 116, 117, 118, 120, and 121 pounds.”

**Your Task:** Find how much each pumpkin weighed.
GM-16. WITH OR WITHOUT FROSTING

Mr. Algebra baked a cake for the Midwest Mathematics Convention. He designed the cake in the shape of a big cube. As he was carrying the cake over to the frosting table, he slipped and sent the cake sailing into the vat of frosting.

Amazingly, the cake stayed in one piece, but all 6 sides were now frosted. He carefully got it out and put it on a platter.

The mathematicians were delighted when they saw the cube-cake with all sides frosted. One mathematician suggested the cake be cut into cube shaped pieces, all the same size. That way, some people could have a piece with no frosting, 1 side frosted, 2 sides frosted, or 3 sides frosted. Kawana, a very creative mathematician, said, “Cut the cake so that the number of pieces with no frosting is eight times more than the number of pieces with frosting on 3 sides. Then you will have the exact number of pieces of cake as there are mathematicians in this room.”

Your Task:

- Using Kawana’s clue, find out how many mathematicians were at the convention. Hint: build models of different size cakes.
- How many mathematicians would be at the convention if the number of pieces with 1 frosted side equaled the number of pieces with no frosting?
GM-17. HAPPY NUMBERS

Some numbers have special qualities that earn them a title, such as “Square Number” or “Prime Number.” This problem will explore another type of number, called “Happy Numbers.”

The number 23 is a Happy Number. To determine if a number is a Happy Number, square each of its digits and add.

\[ 2^2 + 3^2 = 13 \]
\[ 1^2 + 3^2 = 10 \]
\[ 1^2 + 0^2 = 1 \]

Repeat this process.

When the final answer is 1, the original number is called a “Happy Number.”

The number 34 is not Happy Number, as demonstrated below:

1) \[ 3^2 + 4^2 = 25 \]
2) \[ 2^2 + 5^2 = 29 \]
3) \[ 2^2 + 9^2 = 85 \]
4) \[ 8^2 + 5^2 = 89 \]
5) \[ 8^2 + 9^2 = 145 \]
6) \[ 1^2 + 4^2 + 5^2 = 42 \]
7) \[ 4^2 + 2^2 = 20 \]
8) \[ 2^2 + 0^2 = 4 \]
9) \[ 0^2 + 4^2 = 16 \]
10) \[ 1^2 + 6^2 = 37 \]
11) \[ 3^2 + 7^2 = 58 \]
12) \[ 5^2 + 8^2 = 89 \]

Since 89 is repeated in this series, the “Happy Number” process is in a never-ending loop and, consequently, will never equal 1.

Therefore, 34 is not a Happy Number.

Your Task:

- There are 17 two digit “Happy Numbers.” Find as many as you can. Describe your technique for finding happy numbers.
- Remember to keep all your work and ideas so you can refer back to them when writing up what you discovered. It will save you time and help you look for patterns if you keep an organized record of what you try.
- Find five 3 digit happy numbers.
- Find five 4 digit happy numbers.
GM-18. **THE STREETS OF SAN FRANCISCO**

Ms. Speedi lives at the corner of Chestnut and Mason and drives to school, which is located at the corner of Jackson and Grant, every morning. She usually drives down Mason, then turns left on Jackson. However, after going 12 blocks, she’s late for school! See if you can find a shorter route.

The streets in downtown San Francisco are set up in a grid with Columbus Avenue running diagonally between them, as shown on the map at right. Columbus directly meets the intersection of Chestnut and Taylor, as well as the intersection of Washington and Montgomery.

One-way streets are shown with arrows. Kearny is unusual as it only allows traffic that heads toward Columbus.

Columbus is a two-way street. You can turn on or off of Columbus from any street that intersects it.

**Your Task:**
- Help Ms. Speedi find the shortest route from home to school. Be sure to check out alternative routes!
- Find the shortest route for Ms. Speedi to take home after school. Is this route shorter or faster than her route to school?
GM-19. PYTHAGOREAN TRIPLES

3, 4, 5 \hspace{1cm} 7, 24, 25

Above are two examples of a Pythagorean Triple. Pythagorean Triples are made up of whole numbers. These two examples are special because in both cases the hypotenuse is 1 greater than the longer leg.

Your Task:

• How many Pythagorean Triples can you find where the hypotenuse is one more than the longer leg? How many do you think there are? Explain your answer.

• Find one where one of the legs is 37 and the hypotenuse is one more than the longer leg. Explain how you got your answer.
GM-20. COOKIES FOR DESSERT

a) Three algebra students were doing their homework together. As a treat, one mom offered to bake some cookies. While waiting for them to cool, all three students fell asleep. After a while, Latisha woke up, ate her equal share of cookies and went back to sleep. A little while later, Susan woke up, ate what she thought was her equal share and fell asleep again. Then Hieu woke up, ate what she thought was her equal share, and went back to sleep. Later, all three kids woke up and discovered 8 cookies left. How many cookies were baked originally?

b) The next day, four students got together to study. Another mom baked cookies. Again the four students fell asleep. As before, they woke up one at a time and each ate her equal share. When they all awakened, they discovered 81 cookies remained.

How many cookies were baked originally?

Your Task:

• Solve both problems.
• Compare the original cookie numbers to the final numbers of cookies left. What is their relationship?
• **What would happen if there were 5 students?** As before, each student ate her equal share of what was left. When they all awakened, how many cookies remained? How many cookies were baked originally?
• Explain how this problem would work for any number of students.
GM-21. **HOW IS THAT POSSIBLE?**

Ms. Speedi needs your help! She wrote a test question (without making a key) and does not know the answer. To her surprise, her class arrived at two different solutions and Ms. Speedi does not know which answer is correct. The question was:

“Using scissors, cut out the shapes at right, form a large triangle, and find the total area of all the pieces. Be sure to sketch your large triangle and justify your solution.”

Half of the class put the pieces together as shown in figure 1 at left.

By using the triangle formula, the total area of the pieces in Figure 1 is $60 \text{ un}^2$.

However, the other half of her class put the pieces together as shown in Figure 2. This triangle had the same overall area, but there was a gap of 2 square units inside!

Subtracting the missing area, the total area of the pieces in Figure 2 is $58 \text{ un}^2$.

Ms. Speedi is not sure which answer is correct and needs to know so she can grade these tests. She’s provided you with a Resource Page so you can cut out the pieces for yourself and test these two solutions.

<< problem continues on next page >>
Your Task:

- Cut out the pieces on the Resource Page and arrange them as shown in both figures.
- Calculate the areas of both configurations and check the solutions given above.
- Write a letter to Ms. Speedi explaining to her what happened. Give her advice on how to grade these tests.
GM-22. STAIRCASES

Study the following staircases.

The first staircase is made of one cube (its volume is one cubic unit) and its surface is composed of six squares.

The second staircase has a volume of 6 cubic units and a surface area of 22 square units.

Your Task:

• Find the volume and surface area of the third staircase shown above.
• Describe what the 50th staircase will look like. Use geometric patterns, tables, and sketches to find its volume and the surface area.
• In your explanation, describe as many patterns as you can and explain how you arrived at your answers and why you think they are correct.
GM-23. BASIL’S BACKYARD (or THE CITY PERMIT)

Jerome has a problem. His pet schnauzer, Basil, has recently behaved very badly and your mail delivery will stop unless you can prevent Basil from reaching the mailbox. To make matters worse, a local city ordinance requires that you obtain a permit to leave a dog leashed during the day. In order to receive the permit, Jerome must fulfill the following requirements:

- The dog must have water.
- The dog must have access to shade.
- The dog must have at least 1,600 square feet to roam.

Jerome can attach the leash anywhere along the outside of his house as long as the requirements listed above are met. Basil’s water dish is located below the water faucet, located two feet from the right front corner of Jerome’s house, as shown in the diagram at right. The porch off the left side of Jerome’s house provides shade. Jerome’s mailbox is on the front of his house, 5 feet from the right-hand corner.

Your Task:

- Decide where Jerome can attach Basil’s leash, and how long the leash should be to meet the city’s requirements, as well as please the mail deliverer. Since Jerome likes to spoil Basil, try to maximize the space Basil has to roam.
- Obtain a city permit from your teacher and fill it out for Jerome.
GM-24.  THE COOKIE CUTTER

A cookie baker has an automatic mixer that turns out a sheet of dough 12 inches wide and \( \frac{3}{8} \) inch thick. His cookie cutter cuts 3-inch diameter circular cookies as shown at right. The supervisor complained that too large a fraction of the dough had to be re-rolled each time and ordered the baker to use a 4-inch diameter cookie cutter.

Your Task:

• Analyze the percentage of dough that needs to be re-rolled for different sizes of cookies.

• Write a note to the supervisor explaining your results. Justify your conclusion.
GM-25.  CANDY SALES

For a fund-raiser, each math club member must sell 30 candy bars each day for a week. Although they all sell the same type of candy, the members may choose the sales price to help them compete for top sales member.

Alfredo decided to sell three candy bars for $1, earning $10 per day, while June priced hers at two for $1, earning her $15 per day.

One day, both Alfredo and June were on a field trip, so they asked Bomani to sell their candy bars for them. Bomani agreed and promised he would not change their prices. He decided that instead of offering three for $1 and two for $1, he would put them together and sell the 60 candy bars for five for $2.

When Alfredo and June returned, Bomani handed them the money he earned for the day, $24. Alfredo and June were angry and demanded the dollar they were sure Bomani stole! Bomani is now confused... what happened?

Your Task:

- Write a letter to Alfredo and June to explain what happened to the missing dollar.
GM-26 DIFFERENCE OF TWO SQUARES

In this unit you have organized data, described patterns with diagrams and words, and talked and worked together in a study team. You now have a problem to investigate that will require all of those skills. This is a big problem that should need the entire team’s effort in order to complete it successfully.

a) Study the examples in the table.

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SOLUTIONS (Difference of Squares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>$3^2 - 1^2$</td>
</tr>
<tr>
<td>15</td>
<td>$8^2 - 7^2; 4^2 - 1^2$</td>
</tr>
</tbody>
</table>

b) Express the numbers 1 through 25 as a difference of two squares. Some numbers have more than one solution as shown with the number 15. Some numbers might have no solution. Find as many solutions for each number as your team can and organize them neatly and clearly on a chart.

c) Describe as many patterns as you can find.

d) Write an explanation of how your study team went about solving this problem. How did you start? Did someone find a technique that helped you find more solutions? Did you use patterns or guess and check to help? How did you decide what your chart would look like?

e) Prepare a presentation to share your results with the class. Everyone in your study team must be part of the presentation. Your presentation should include an introduction, your chart(s), explanations of your patterns, and an explanation of how your team solved the problem. (Hint: it is important for the class to be able to read your results and see your patterns as you speak. Therefore be aware that your chart needs to be written large enough to be seen easily by everyone.)

Make sure each person in your study team understands what he or she needs to complete before coming to the next class. Your team will need to present your results then.

f) Extension: Can you describe a way to find solutions for any given number? For example, can you write 43, 99, or 60 as a difference of two squares? If so, explain how you found this general solution and include it in your presentation.