The Handshake Problem
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A political consultant is going to conduct a workshop for 100 political candidates called "Running for Office: Practical Skills." The participants will be candidates for judgeships, state legislature, county supervisor, and various board positions. They will include 48 men and 52 women. These candidates from two political parties are going to learn, among other things, how to shake many hands without fatigue. So that the consultant can plan her time, she needs to know how many handshakes there will be if every candidate shakes every other candidate's hand.

Problem Solving Strategies:
1. State the goal of the problem specifically.
2. Decide what is known and what is unknown.
3. Throw out irrelevant information.
4. Try something "off the wall."
5. Guess and check.
6. Simplify the problem.
7. Act it out or use objects.
8. Make a picture or a diagram.
9. Organize the data.
10. Identify patterns.
11. Work backward.
12. Use algebra.
13. Consider the answers that make sense.
14. Solve the problem another way.
15. Generalize.
16. Review.

The most important take-away idea is the strategies we used to try to solve the problem, NOT the problem itself or how to solve it. Mathematician Polya simplified these to four basic steps:

A. Understand the problem.
B. Make a plan.
C. Carry out the plan.
D. Look back.

Other problems that involve the same mathematics:

1. In geometry, how many ways can 100 points be connected, 2 at a time, by a line segment if the points are on the circumference of a circle?
2. In calculus, find $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$ or $\sum_{i=1}^{99} i = \frac{99(100)}{2}$
3. In probability and statistics, find $C(100,2) = \frac{100!}{98!(2!)} = \frac{100(99)}{2}$

References:
Managing the Mean Math Blues: Math Study Skills for Student Success by Cheryl Ooten with Kathy Moore (Pearson Education, 2010)
Beyond Equals by Ruth Afflack (Math/Science Network, 1982)
How to Solve It: A New Aspect of Mathematical Method by G. Polya (Princeton Science Library, 1988)