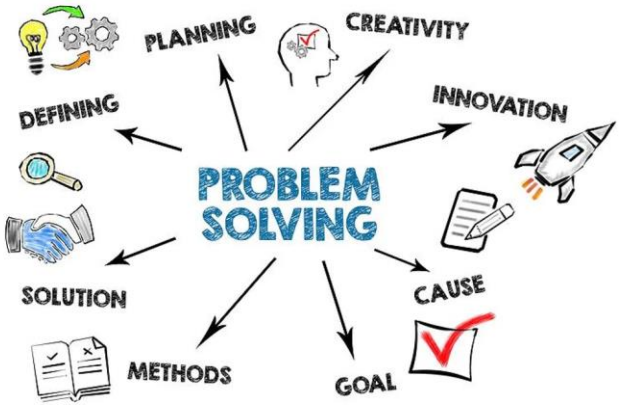
SOLVE METHOD

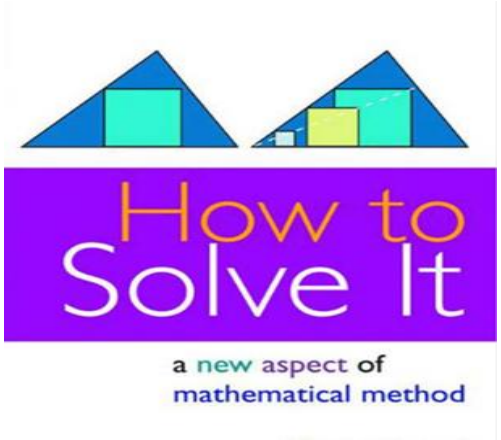
By

Jonathan A Grant



Mathematics A Complex Problem Solving

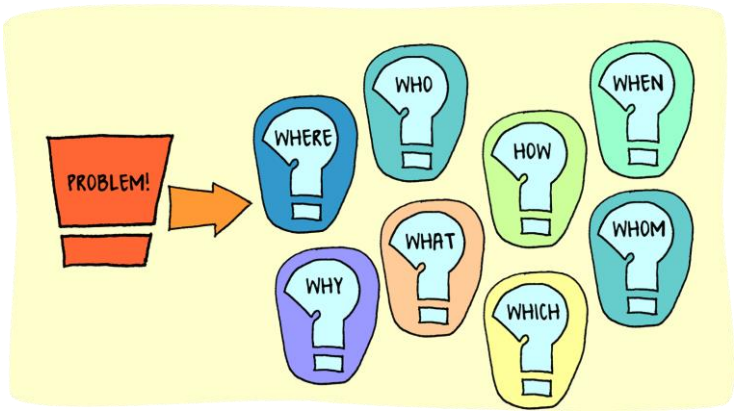
George Polya's Book "How to Solve it" in 1945



- **Students Develop Procedural Fluency**
- **Lack Deep Conceptual Understanding**
- **Making Connections Between Mathematical Ideas and Real Life Application**

How to Solve It

a new aspect of mathematical method



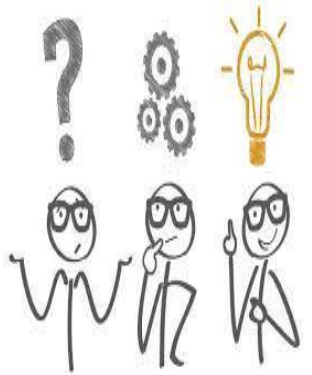
Why Is Problem Solving Important

Problem-solving in mathematics supports the development of:

- **The ability to think creatively, critically, and logically**
- **The ability to structure and organize**
- **The ability to process information**
- **Enjoyment of an intellectual challenge**
- **The skills to solve problems that help them to investigate and understand the world**

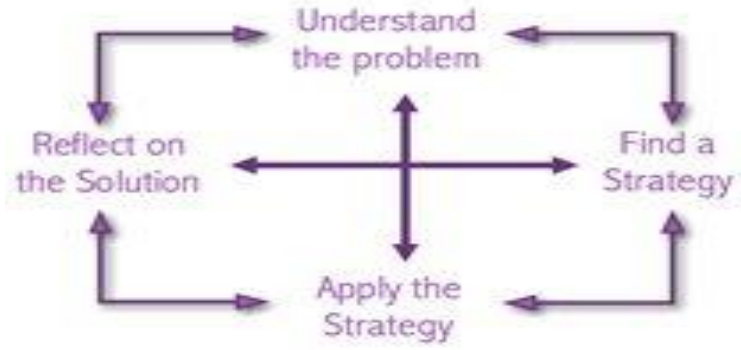
How to Solve It

a new aspect of mathematical method



Student Concern With Problems Being “Problematic”

1. Understand and explore the problem
2. Find a strategy
3. Use the strategy to solve the problem
4. Look back and reflect on the solution



Polya's Problem Solving Techniques

Polya's First Principle: Understand the problem

• **First**. You have to understand the problem. • What is the unknown? What are the data? What is the condition? • Is it possible to satisfy the condition? Is the condition sufficient to determine the unknown? Or is it insufficient? Or redundant? Or contradictory?

Polya's Second Principle: Devise a plan

• **Second**. Find the connection between the data and the unknown. You may be obliged to consider auxiliary problems if an immediate connection cannot be found. You should obtain eventually a plan of the solution.

Polya's Third Principle: Carry out the plan

• **Third**. Carry out your plan. • Carrying out your plan of the solution, check each step. Can you see clearly that the step is correct? Can you prove that it is correct?

Polya's Fourth Principle: Look back

• **Fourth**. Examine the solution obtained. • Can you check the result? Can you check the argument? • Can you derive the solution differently? Can you see it at a glance?

SOLVE METHOD

How to Solve It

a new aspect of mathematical method

Modeling in Mathematics

SOLVE

S

- **Solve the Problem**
- Underline the question. Write the question in your own words.
- What am I trying to find?

O

- **Organize the Information**
- Read each sentence. Determine the important information. List the facts. Cross out any unnecessary information.
- What do I know?

L

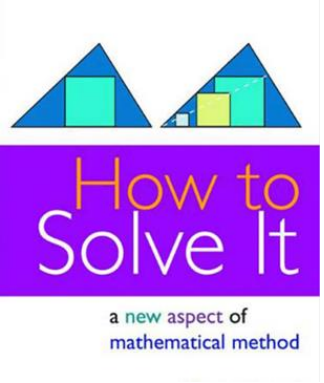
- **Line Up the Plan**
- Determine a strategy for solving the problem. Decide what steps you need to take to solve the problem.
- What steps will I take?

V

- **Verify Your Plan**
- Estimate the solution. Follow the plan to solve the problem.
- How will I carry out my plan?

E

- **Examine Your Results**
- Write the answer in a complete sentence. Determine if the answer is reasonable and makes sense.
- Does my answer make sense?



Implementation Strategy

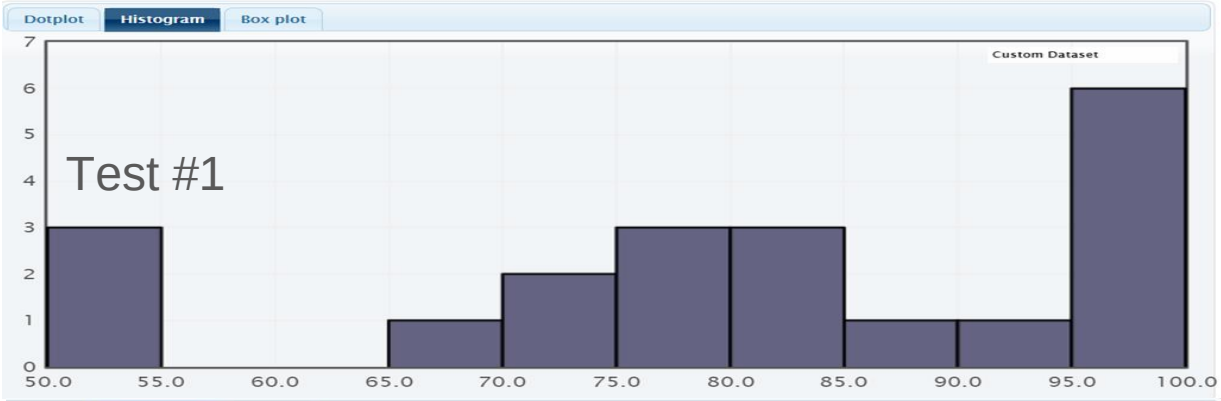
Course Exams:

Test 1: No Strategy Required

Test 2: SOLVE Method Required

Test 3: Either Method

Final Exam: Either Method, 2 Questions Require SOLVE Method



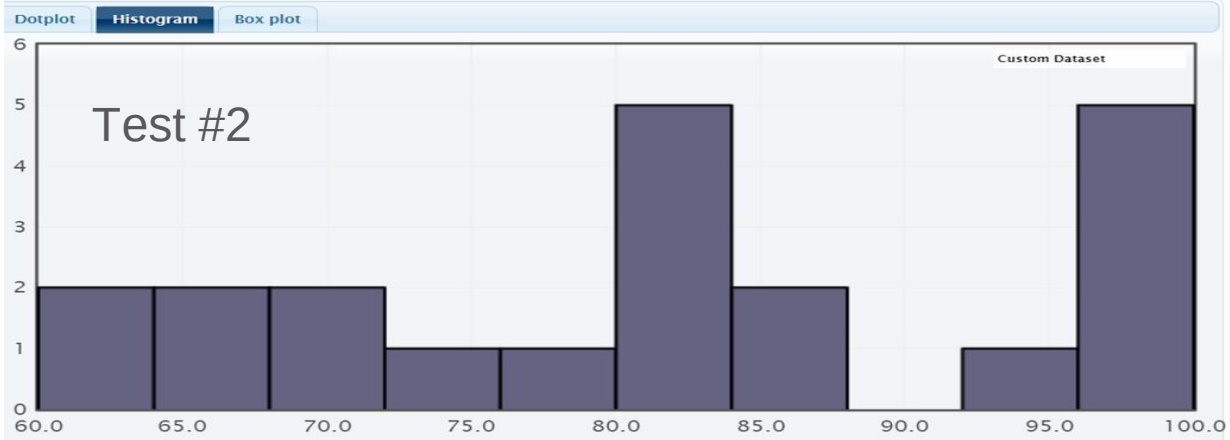
Summary Statistics

Statistic	Value
Sample Size	20
Mean	80.250
Standard Deviation	16.889
Minimum	50
Q_1	71.000
Median	80.000
Q_3	96.000
Maximum	100

Histogram Controls Set Limits

Number of buckets: 10

lower bound | upper bound | frequency



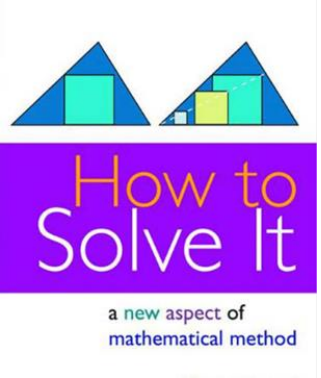
Summary Statistics

Statistic	Value
Sample Size	21
Mean	81.286
Standard Deviation	12.669
Minimum	60
Q_1	70.000
Median	80.000
Q_3	94.000
Maximum	100

Histogram Controls Set Limits

Number of buckets: 10

lower bound | upper bound | frequency

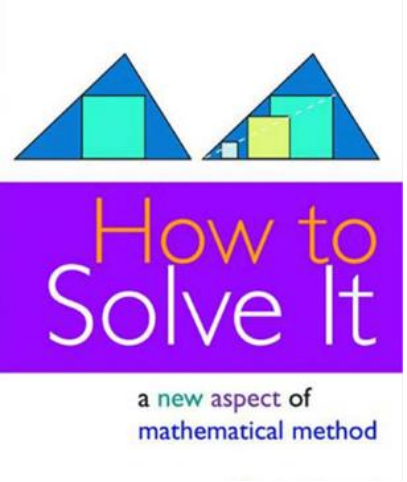


Student Feedback To SOLVE Method

“As a former LEP student, word problems always made me nervous, but the SOLVE method took away some of that fear”

“At first I was challenge by using this method but after several uses I found value in it”

“ I wish this method was presented to me in middle and high school it would have made my whole math experience better”



Thank you to Professor Joan and the 2023 SET COHORT!!