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For the Student

Figure it out is a booklet that teaches problem-solving skills. In each lesson, you will learn a strategy that you can use to solve problems. Your teacher will ask you questions to help you use the strategy to solve the first problem in each lesson. Your teacher will also guide you through the second problem in each lesson, giving you some things to think about and ways to help you find the solution. The last two problems in each lesson are for you to do on your own. These problems give you practice using the strategy you have just learned.

By the time you have completed this booklet, you will have learned eight strategies to use when solving problems. The strategies will be useful in school and in your everyday life. Hopefully, you will find that calculators and computers are useful for computation, but human beings are needed to solve problems.

When you Use this Booklet
- Read each problem carefully before you begin to solve it.
- Think about the questions that follow the first two problems in each lesson. They will help you to understand the problems and find the solutions.
- Use the blank space on the page to work through problems. You can write anywhere in this booklet if it will help you to solve a problem.
- Once you have solved a problem, check your solution to be sure it makes sense.
- Write the solution to a problem on the line that follows the problem.

This *Figure it out* booklet was prepared for students by Sandra R. Cohen.

Look for Patterns

1. How many 2-digit numbers have a remainder greater than 1 when they are divided by 5?

   Questions

   a. Which 2-digit numbers will have no remainder when they are

      divided by 5? _____

   b. How many numbers between 10 and 15 have a remainder greater than

      1 when they are divided by 5? _____

   c. How many numbers between 15 and 20 have a remainder greater than

      1 when they are divided by 5? _____

   d. What is the greatest remainder possible when dividing any 2-digit

      number by 5? _____

   Apply the Strategy
   To solve the problem, use what you know about dividing 2-digit numbers by
   5. Look for a pattern that will help you find the solution.

   Solution _____

   e. What patterns did you discover while solving the problem? How were

      the patterns useful? _____

      _____

2. Imagine that there are 16 beans in Circle A and no beans in Circle B. Suppose you want to move all of the beans from Circle A to Circle B. From Circle A to Circle B you can only move exactly 5 beans at a time. From Circle B to Circle A you can only move exactly 3 beans at a time. What are all the moves you must make to move the beans from Circle A to Circle B?
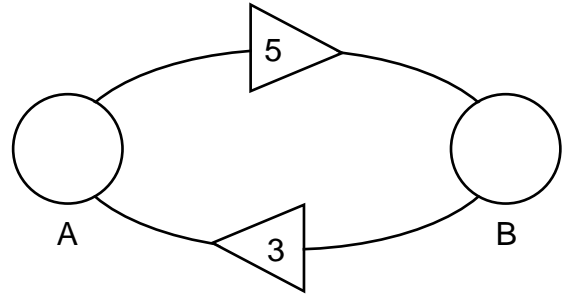
Think about:
- How many moves do you think it will take?
- Why can't you move all the beans from Circle A to Circle B at one time?
- What must your first move be? Why?
- Is more than 1 move possible for your second move?

Work with other students to experiment with the information in the problem. Use counters and the diagram above, or make a large diagram and act out the problem.

Solution _____

On your Own
Work with other students. Experiment with the information in the problems to solve them.

3. If 1 vertical line is drawn through the Z, the Z is cut into 4 pieces. If 2 parallel vertical lines are drawn, the Z is cut into 7 pieces. How many parallel vertical lines will cut the Z into 25 pieces?
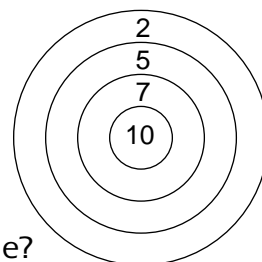
_____
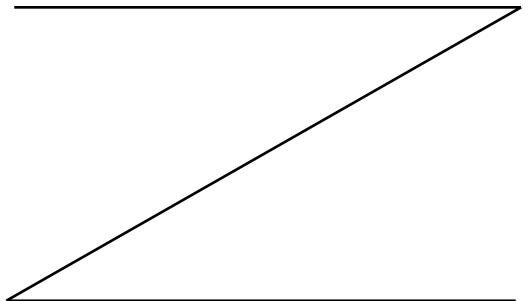
4. Write the numbers 7, 8, 9, 70, 80 and 90 in the circles so that the product of the 3 numbers in every line is 5040. Use each number only once.
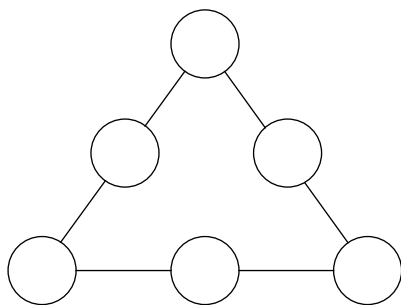
Make a List

1. If 5 balls stick to the number board, which of the following scores can be made? (*Hint:* More than one ball can land on a number.)
   26, 7, 31, 17, 49, 34

   ### Questions

   a. What is one way you could find whether or not a score could be made?

   _____

   b. Can both odd and even scores be made? How do you know this?

   _____

   c. What is the least score that can be made if 5 balls land on the number board? _____

   What is the greatest score that can be made? _____

   d. Suppose you wanted to find all the scores that could be made with 5 balls. What is one way to organise your work to be sure you find all the scores?_____

   _____

   ### Apply the Strategy
   Make an organised list of all the possible scores that can be made with 5 balls. Start with the least possible score that can be made if 5 balls land on the number board. Find out which other scores can be made. Use the table to record your list. Make the table longer if you need to, or make a longer table on another piece of paper. Then use your list to solve the problem.

   Number of balls on each number

2	5		4						
5			1						
7									
10									
Score	10	11	12	13	14	15	16	17	

   ### Solution _____

   e. How can you be sure a score cannot be made?_____

   _____

Figure it out, Book 5 #CA-9186