

# Contents

Introduction .....	4
Maths Problems .....	5
• Act it Out .....	5
• Use a Picture .....	8
• Guess and Check .....	9
• Use a Pattern .....	12
• Make a List .....	14
• Use Logical Reasoning .....	18
• Solve a Simpler Problem .....	22
• Draw a Picture .....	24
• Work Backwards .....	26
• Make a Table .....	28
• Use a Model .....	29
• Look for a Pattern .....	31
• Experiment .....	35
• On Your Own .....	37
• Mixed Practice .....	38
The Teacher Guide and Answer Section .....	41

## **Introduction**

Problem solving is the process of applying acquired knowledge to different situations. It is the basic skill of mathematics and an integral part of the mathematics curriculum at all levels of instruction.

**Figure it Out** is designed to teach strategies for solving mathematical problems. As students work through the activities, they learn to read problems carefully, to think about the content of problems and to use what they know about numbers and mathematics to decide how to find solutions. Each problem in **Figure it Out** has some unique quality that requires students to think carefully about how to solve it. Students can relate many of the problems to real life.

The most exciting aspect of teaching mathematics is the discoveries students make as they work through problems. Guide them with questions, encourage the use of manipulatives and be sure to give students time and space to discover.

### **A note on teaching problem solving:**

In order for students to learn the skills needed to solve problems, it is important for you to create a problem-solving environment in the classroom. This involves three factors. First, students must see you as a problem solver and absorb your problem-solving processes. You should verbalise your thought processes. Second, problem solving takes time. Always provide students with sufficient time to explore problems. Third, problem solving is a noisy activity. You should be prepared to tolerate higher noise levels in the classroom when students are solving problems.

### **A note on co-operative learning groups:**

Assigning students to groups of three or four to work co-operatively at solving problems can be a very effective teaching method. Any of the pages in **Figure it Out** can be completed by students working in small groups. Groups should be comprised of students who work well together. Placing students of varying abilities in one group is usually successful. Rules for group work should be established in advance and adhered to.

### **A note on using manipulatives:**

Learning theories suggest that students whose mathematical learning is firmly grounded in concrete experiences will be more likely to bridge the gap between the world in which they live and the abstract world of mathematics. The manipulatives—objects that appeal to many senses and can be handled—help students understand both the meaning of mathematical ideas and the application of these ideas to real-world situations. Throughout the book, a variety of manipulatives is used. You should encourage students to use different kinds of manipulatives as they work through the problems. If the classroom is well equipped, there will be many choices of objects to use as counters. If these types of manipulatives are not available in the classroom, you can collect common objects to use. With the help of students and parents, and some ingenuity, you can quickly accumulate many materials. Possible manipulatives to use as counters include the following:

beads, bingo chips, bottle tops, bread tags, buttons, dried beans, keys, old game pieces, paper clips, pasta, pipe cleaners, icy pole sticks, shells, straws

### **One important final note:**

The joy of solving problems is the variety of approaches that students will use to find the answers. Many of these strategies are included in this booklet; many more can't be included as they are "invented strategies", which the student devises and explains to the group. It is important that all the different ways that students discover to solve the problems be considered important and be discussed in class. Do not channel all student solutions to all problems into a particular strategy simply because that strategy is named in the title of the lesson.

## Act it Out

1. Judy and Jay each have 15¢. They want to buy 5 bananas. The bananas cost 5¢ each. The friends put their money together. Do they have enough money to buy the bananas? If so, how much extra money do they have? If not, how much more money do they need?

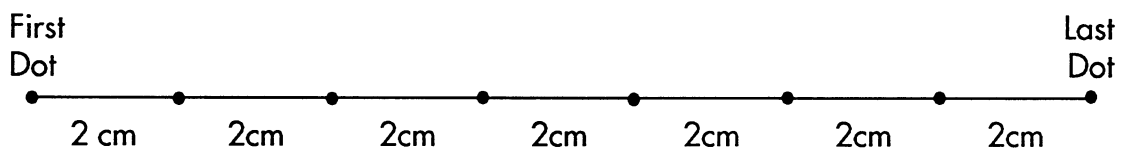
Underline the correct answer. Fill in a blank.

**Answer:** Judy and Jay (do, do not) have enough money.

They have \_\_\_\_\_ ¢ extra.

They need \_\_\_\_\_ ¢ more.

2. How far is it from the first dot to the last dot?



**Answer:** It is \_\_\_\_\_ cm from the first dot to the last dot.

3. The students in Mrs Winston's class made groups to work on projects. First they tried to make groups of 2 students. Next they tried groups of 4 students. Then they tried groups of 5 students. Each time they made groups, 1 student was left out. When they made groups of 7 students, no one was left out. How many students were in Mrs. Winston's class?

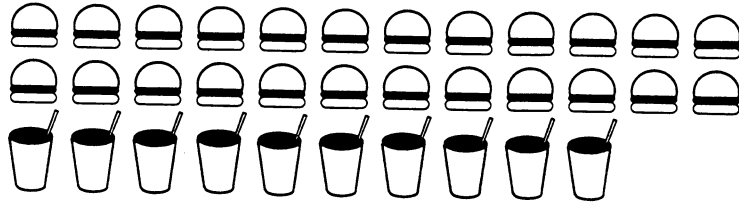
### Questions

- a. How many students might be in a year three class? \_\_\_\_\_  
 \_\_\_\_\_
- b. You can count by 2's, 4's, 5's and 7's. How can this help you find the answer? \_\_\_\_\_  
 \_\_\_\_\_
- c. How can you tell if the answer will be an even number or an odd number? \_\_\_\_\_  
 \_\_\_\_\_

## Use a Picture










11. King Burgers gives away 1 free drink if a family buys 4 hamburgers. The Turner family will buy 24 hamburgers for a party. How many free drinks will the Turners get?

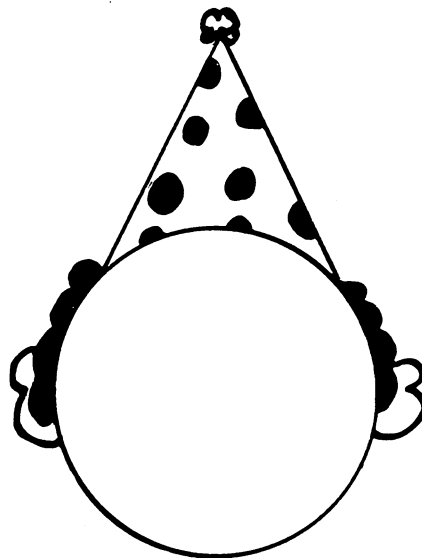
Use the picture. Find the answer



**Answer:** The Turners will get \_\_\_\_\_ free drinks.

12. Draw a face on the clown. Circle the eyes, nose and mouth you choose. Make his face add up to 18¢.

<b>Eyes</b>	 4¢	 7¢	 5¢
<b>Nose</b>	 3¢	 5¢	 2¢
<b>Mouth</b>	 8¢	 6¢	 9¢



## Guess and Check

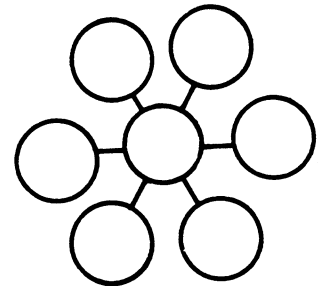
13. On Planet Plurton, Plurtriads have 3 legs. Plurtetrads have 4 legs. Lisa the Astronaut counted 31 legs. How many of each creature did she meet? (*Hint: Watch out for more than one answer.*)

**Answer:** \_\_\_\_\_

14. A barrel full of flour weighs 40 kilograms. The same barrel filled with nails weighs 60 kilograms. If nails weigh twice as much as flour, how much does the empty barrel weigh?

**Answer:** \_\_\_\_\_

15. Write the numbers 1-7 in the circles so that the sum of the numbers in every line is 14. Each number may be used only once.



16. Three friends went shopping. Together, Dan and Jan spent \$30. Jan and Van spent \$17. Dan and Van spent \$25. How much did each friend spend?

**Answer:** \_\_\_\_\_

17. Each of the letters A, T and E stands for a different number. Find the number each letter stands for.

A = \_\_\_\_\_ T = \_\_\_\_\_ E = \_\_\_\_\_

$$\begin{array}{r} AT \\ + A \\ \hline TEE \end{array}$$

18. Put the digits 1, 2, 4, 6, 8 and 9 into the squares to make two addends with a sum of 705.

$$\begin{array}{r} \square \quad \square \quad \square \\ + \square \quad \square \quad \square \\ \hline 7 \quad 0 \quad 5 \end{array}$$