



K-G4  
Basic

G5-G8  
Advanced

# Helping With Math

GRADES

## Problem Solving

Suitable for students  
**aged 4-13**



United Nations' Day every October 24th



This pack is suitable for learners aged 4 to 13 years old or kindergarten to 8th graders. The content covers fact files and relevant basic and advanced activities of various math topics that aim to develop and strengthen the learners' problem-solving skills.

### Problem Solving As a Mathematics Skill

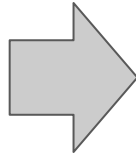


Problem-solving skills refer to the ability to identify a problem, determine its origin, and figure out all possible solutions to solve the problem. These are also a set of skills where you could formulate a variety of unique ways to solve a problem.



# IMPORTANCE OF PROBLEM-SOLVING SKILLS

Mathematics aids us to understand the world and to provides an effective way of building mental discipline. Math encourages logical reasoning, critical thinking, creative thinking, abstract or spatial thinking, problem-solving ability, and even effective communication skills.



## Problem solving...

- plays a significant factor in mathematics and should have a critical role in the mathematics education of K-12 students.
- enhances a generic ability to solve real life problems and apply mathematics in real life situations.
- makes students to believe in their ability to think mathematically. They will appreciate that learning math means finding the solution to a problem.

## Where can we apply problem-solving skills?

- in managing your finances
- in shopping for the best price of goods
- in preparing/cooking food
- in figuring out distance, length, or weight
- in generating more than one solution/alternative
- in making the best decision/option
- in predicting possible outcomes



# PROBLEM-SOLVING STRATEGY

## George Polya's Problem Solving Technique

**Understand** **Read and Think**

**Plan** **Choose a Strategy**

Fruit	Cookies
1	3
2	6
3	9

Number Line: 0 1 2 3 4 5 6 7 8 9 10

**Do** **Solve the Problem**

$$3 + 3 + 3 = 9$$

**Check** **Explain Your Work**

"I made three hops of 3 on the number line"

### Step 1:

- Do you understand all the words in the problem?
- What are you asked to find or show?
- Can you state the problem in your own words?
- Are the details enough for you to find the answer?



### Step 2:

- Is it possible to use guess and check technique?
- Can you eliminate possibilities?
- Which plan will work? Which plan will not work?
- Will I use addition or subtraction?



### Step 3:

- What is the equation?
- What will be the next step?
- Can you prove your solution?

### Step 4:

- Can you check if your answer is correct?
- Does everything turn out well?
- What are the steps that worked and didn't work?



## SAMPLE/APPLICATION

### Basic Examples:

1. In a dialogue for UN Climate Action, 12 French, 18 Chinese, and 15 Africans are seated together in a long rectangular table. How many people are seated in all?

Let's answer this problem using Polya's Problem Solving Techniques

Step 1: *Understand: What are you asked to find?*

Answer: You are asked to find the total number of people seated in the long rectangular table.

Step 2: *Plan: Will I use addition or subtraction?*

Answer: Since the problem is asking for a total number of people in a table, the operation to be used is ADDITION.

Step 3: *Do: What is the equation?*

Answer:  $12 + 18 + 15 = N$ , where N stands for the sum.

Step 4: *Check: Can you check if your answer is correct?*

Answer:  $12 + 18 + 15 = 45$ . There are 45 people seated in all.



## SAMPLE/APPLICATION

### Advanced Example:

2. Mr. António Guterres, the UN secretary-general, presented the committed Green Climate Fund for the past five years to the main bodies. The details are given below.



Year	Amount in USD (Billions)
2016	1.352
2017	4.781
2018	5.043
2019	5.989
2020	6.012

What is the average of the Green Climate Fund in the past five years?

**Step 1:** *Understand: What are you asked to find?*

Answer: The average of the Green Climate Fund in the past five years.

**Step 2:** *Plan: What concept and procedure will I use?*

Answer: You need to apply the concept of mean (measures of central tendency) to find the average.



## SAMPLE/APPLICATION

Step 3: *Do: What is the equation?*

Answer: 
$$\frac{1.352 + 4.781 + 5.043 + 5.989 + 6.012}{5} = N$$

Step 4: *Check: Can you check if your answer is correct?*

Answer: The mean of the data is 4.6354. Thus, the average GCF is 4.6354 billion USD.

What are your thoughts of using the Polya's Problem Solving Techniques in answering the given problems? Share it below.



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# THE UN MEMBERS

K - G4  
Basic

Here are the UN members for the celebration of United Nations Day. Read and solve each situation below.

1. In a particular auditorium, 6 French, 5 Chinese, and 2 Africans are seated together in a round table. How many people are seated in all?

Addition sentence:

Solution and answer:



2. A group of twelve European people and ten Americans arrived at the UN meeting hall at the same time. What is the total number of who arrived?

Addition sentence:

Solution and answer:





# EVERY 24TH OF OCTOBER

K - G4  
Basic

Remember to celebrate United Nations Day every 24th of October. The Smart Academy prepared a cultural show for the UN Concert. Apply your problem-solving skill to determine the answer.

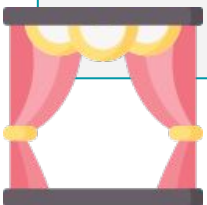
1. The dry run for the cultural show will start at 9:00 am. The time now is 7:45 am, how many minutes are there before the start of the dry run?

2. Ashley said that she arrived 18 minutes before the start of the dry run? When did Ashley arrive?



3. Due to the traffic jam, Peter arrived 15 minutes late after the dry run. What time did Peter arrive?

4. If the dry run will start at 9:00 am and will end at 10:15 am, how long is the duration of the entire show?



# LET'S GO TO GENEVA!

K - G4  
Basic

Analyze the given table below about the location of the three UN delegates travelling to Geneva, Switzerland. Then, answer the questions that follow.

	Place of Origin	Distance from Geneva
Delegate A	New York City, USA	3,860 mi
Delegate B	Seoul, South Korea	5,588 mi
Delegate C	Cairo, Egypt	1,756 mi

1. If all of them will leave their respective locations at the same time and assume that their plane is flying with the same speed, who will be the last to arrive and why?

2. Convert the flight distance of Delegate A to km. What is its equivalent?



# CELEBRATE CULTURAL DIVERSITY

K - G4  
Basic

United Nations Day is one of the most famous observances in the world. Refer to the situation below and solve it using the Polya's problem solving technique.



David and Uri would like to organise an international dinner to explore the traditional dishes of other cultures. This is their way of celebrating United Nations Day. To do that they need to buy the following ingredients: 1 lb of wheat tortilla, 2  $\frac{1}{2}$  lbs of ground beef,  $\frac{1}{2}$  lb of tomato, and a quarter lb of white onions. What is the total weight of all of the ingredients?

Step 1:

Step 2:

Step 3:

Step 4:



# THE GCF

K - G4  
Basic

**The Green Climate Fund is a unique global platform to respond to climate change. As part of the celebration of UN Day, you and your friends decided to volunteer in a tree-planting program. Along the way, there are problems needed to be solved. Use your problem solving skills to answer the following.**

1. The dimensions of the watershed where small plants will be planted are 85 ft by 90 ft. If in every square feet, a small plant is needed, how many small plants are needed in all?

Step 1:	Step 2:	Step 3:	Step 4:
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2. In reference to item no.1, if a volunteer is needed to plant 18 small plants, how many volunteers are needed to complete the task?

Step 1:	Step 2:	Step 3:	Step 4:
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# UNICEF FUN-RUN EVENT

G5-G8  
Advanced

In line with the celebration of the United Nations Day, these people organize a fun-run to raise funds to be donated to UNICEF. Refer to the situation below and solve.

To celebrate the UN Day, the UN Volunteers Club of Smart Academy organize a fun-run event where each participant must pay a certain amount to join. The proceeds of this event will be donated to UNICEF to aid the children of the third-world countries to quality education. The details of the fun-run are given below:

5k - \$ 10.45

8k - \$ 15.45

10k - \$19.45

15k - \$ 25.45



If there are 40 runners for 5k, 28 runners for 8k. 56 runners for 10k and 20 runners for 15k, how much is the total proceeds of the event?



# THE GREEN CLIMATE FUND

G5-G8  
Advanced

Help the UN secretary-general to find the value of the missing Green Climate Fund below.

Mr. António Guterres, the UN secretary-general, presented the committed Green Climate Fund from 2010-2014 to the main bodies. The details are given below.



Year	Amount in USD (Billions)
2010	1.35
2011	4.75
2012	<b>x</b>
2013	5.95
2014	<b>2x</b>

If the average of the Green Climate Fund in the past five years is 5.11 billion USD, find the value of  $x$  and  $2x$ .

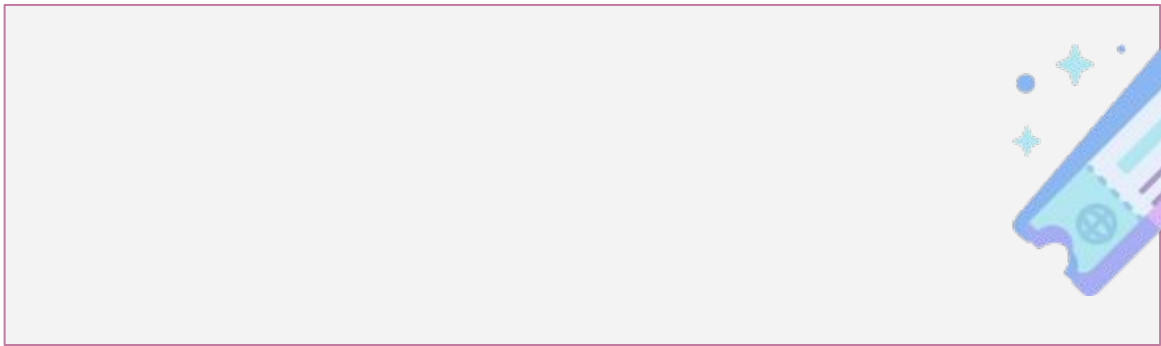


# FREE TICKET TO GENEVA

G5-G8  
Advanced

Mark's dream is to visit the UN Headquarter in Geneva, Switzerland. There is a raffle event where the grand prize is round-trip tickets to Geneva. Help Mark to earn the raffle stub by completing the task below.

1.) What is the factored form of  $\frac{x^2 - 2x - 15}{x^2 - 25}$   $\square$   $\frac{x^2 - 2x - 35}{x^2 + x - 6}$  ?



2.) What is the simplest form of the expression in number 1?

- A.  $\frac{x - 7}{x + 2}$       B.  $\frac{x + 7}{x + 2}$       C.  $\frac{x - 7}{x - 2}$       D.  $\frac{x + 7}{x - 2}$







# MY UN DAY CELEBRATION DIARY

G5-G8  
Advanced

As we wrap up our day of celebration, let us reflect on the skills and topics that you've learned today. Answer the following questions in not less than 3 sentences.

1. Why do you think problem-solving skills are needed in life? How do you use them in relation to the celebration of United Nations Day?



2. Share your two most favorite experiences in celebrating the UN Day.



# ANSWER GUIDE

## Activity 1

1. 13 people
2. 22 people

## Activity 2

1. 75 mins
2. 8:42 am
3. 9:45 am
4. 75 mins

## Activity 3

1. The last one to arrive is the delegate from South Korea because he/she has the farthest distance from Geneva.
2. 6212.068

## Activity 4

- Step 1: the total weight of the ingredients  
Step 2: We should do addition of fractions and whole numbers  
Step 3:  $1 + 2\frac{1}{2} + \frac{1}{2} + \frac{1}{4} = n$   
Step 4:  $4\frac{1}{4}$  lbs in all

## Activity 5

1. The final answer is 7650 plants.
2. We need 425 volunteers.

## Activity 6

The total proceeds is \$2,448.8



# ANSWER GUIDE

## Activity 7

The value of  $x = 4.5$  and the value of  $2x = 9$ .

## Activity 8

$$1. \quad \frac{(x-5)(x+3)}{(x+5)(x-5)} \quad \frac{(x-7)(x+5)}{(x+3)(x-2)} \quad 2. \quad \frac{x-7}{x-2}$$

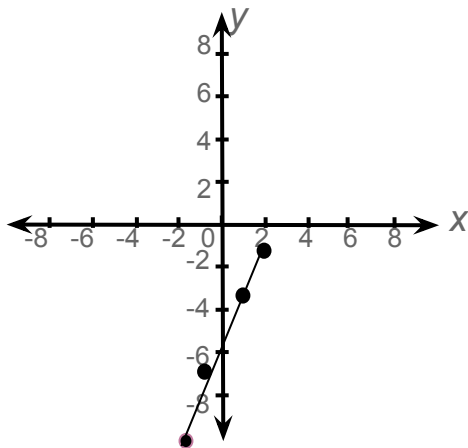
## Activity 9

The relation  $2x - y = 5$  can be written as function rule  $y = 2x - 5$ .

a.  $-9, -7, -3, -1$

b. Ordered pair numbers:  
 $\{(-2, -9), (-1, -7),$   
 $(1, -3), (2, -1)\}$

c.



d. The relation is a function because if we use the vertical line test, a vertical line intersects in no more than one point. Also, this relation is a one-to-one function.

## Activity 10

Answers may vary.



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