





MPORTANT

The information contained in this file is ONLY for the use of registered participants of the 2024 APSMO Maths Games.

All questions and solutions are copyright © 2024 by Australasian Problem Solving Mathematical Olympiads (APSMO) Inc. All rights reserved.

This file and/or its contents must NOT be distributed by any means, including electronically, without written consent from Australasian Problem Solving Mathematical Olympiads (APSMO) Inc.

This file and/or its contents must NOT be made available on the internet in any format. This includes school websites.





APSMO 2024 MATHS GAMES

ORGANISATION AND PROCEDURES For full details, see the Members' Area

• Maths Games papers are to be conducted under test conditions.

DO	DO NOT				
 Supervise students at all times. Maintain silence. Provide blank working paper. Collect, mark and retain the papers. 	 Print the papers prior to the scheduled date. Read the questions aloud to the students. Interpret the questions for students. Permit any discussion or movement around the room. 				
	• Permit the use of calculators or other electronic devices.				

- Papers should be scored by the PICO using the *Solutions and Answers* sheet provided.
- Original student answer sheets should be retained by the PICO until the end of the year.

Absent Students

- A student who is legitimately absent on the date of the Maths Games paper, may sit the paper on their return to school.
- If an absent student does not sit the paper on their return to school they should be marked as 'absent'.
- Note: This policy differs from the Maths Olympiads Absent Student Policy which has additional requirements.



A B S A B B B B B B B B B B B B B B B B	MATHS GAMES	APSMO WEDNESDAY 31 JULY 2024	MATHS GAMES JUNIOR
3A.	Student Name:		
	Fold h		
3B.	ere. Keep your answers hic		
3C.	lden.		
3D.			
3E.			

 $\label{eq:copyright} @ 2024 ~~ Australasian ~Problem ~~ Solving ~~ Mathematical ~~ Olympiads (APSMO) ~~ Inc. ~~ All ~~ rights ~~ reserved.$

ALD	APSILAN PROBLEMAND	MATH	HS w ES	APSMO WEDNESDAY 31 JULY 2024					MATHS GAMES JUNIOR		
Solutions and Answers (Items in parentheses are not required)											
	3A: 12	3B: 3		3C: 1	1		3D: 12		3E: 186		
3 A .	. The question is, How many chocolates are there in the Deluxe box?										
	Strategy 1: Elim	inate All But On	e Possibility	(1)							
	There are four different chocolate boxes: Deluxe, Gift, Party, and Sampler. D G P S 12 12 1 <td< th=""><th>G P S X I I I I I I I X C P S</th></td<>							G P S X I I I I I I I X C P S			
	If Gift has more than 9 chocolates, then Party would have more than $9 \times 2 = 18$ If Gift has more than 9 chocolates, then Party would have more than $9 \times 2 = 18$ The Gift box must contain 9 chocolates, and Party must contain 18.Since there are more chocolates in the Gift box than the Sampler box, the Sampler box must have fewer than 9 chocolates. Therefore the Sampler box has 6 chocolates.The number of chocolates in the Deluxe box is 12.										
	Strategy 2: Eliminate All But One Possibility (2)										
	Party box as th must contain e	here are in the Gift wither 6 or 9 choco	t box, the Gif plates.	t box	Delu	ixe	Gift 6 or 9	Party	Sampler		
	There are mor Sampler box. S chocolates, an	e chocolates in th So the Sampler bo d Gift must have S	e Gift box tha x must conta 9.	an the ain 6	Delu	ixe	Gift 9	Party	Sampler 6		
	There are twice box as there a contain 2 × 9 =	e as many chocola re in the Gift box, • 18 chocolates.	ates in the Pa so Party mus	arty st	Delu	ixe	Gift 9	Party 18	Sampler 6		

The last remaining box size of **12** chocolates must be the Deluxe box.

Follow-Up: Harry wants to buy 18 chocolates. In how many ways can he do this? [4 ways: 3 Sampler boxes, 2 Gift boxes, 1 Sampler and 1 Deluxe, or 1 Party box]





George landed **3** darts in the **7**-point region.

Strategy 2: Solve a Simpler Related Problem



Follow-Up: Suppose George can land any number of darts. In how many ways might George score 42 points? [3 ways: 6 darts in th 7-point region, 3 darts in the 7-point region and 7 darts in the 3-point region, or 14 darts in the 3-point region]





Therefore, is equal to **12**.

Follow-Up: Find \square , so that $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times \square = 7 \times 8 \times 9 \times 10$. [7]



The greatest possible value represented by *BUT* is 186.

Follow-Up: What is the smallest possible value represented by BUT? Note that a leading digit cannot be zero. [104]