

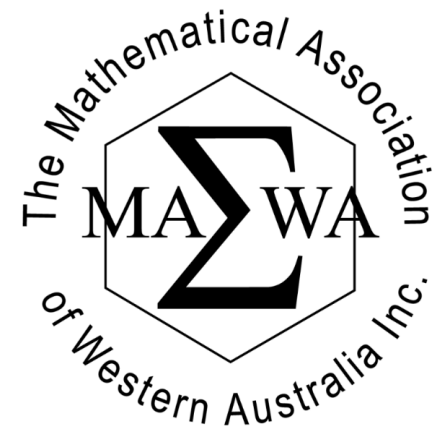


Queensland
Association of
Mathematics
Teachers



The Best (& the Rest)
from the West

Dr John West



Dr John West

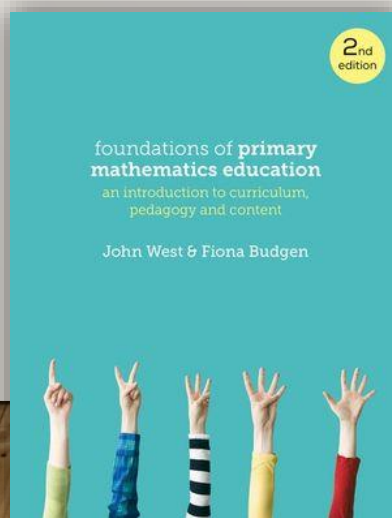
President, *Mathematical Association of Western Australia*

Editor, *Australian Primary Mathematics Classroom*



Previously:

- Mathematics teacher, tutor, mentor and G&T coordinator
- Lecturer in mathematics education / pedagogy / assessment / special education / research methods
- Consultant for CEWA, AISWA, GATCA (WA)
- Researcher and author



International **Mathematics** Achievement

4th Grade



23 Point Gap

TIMSS
2015



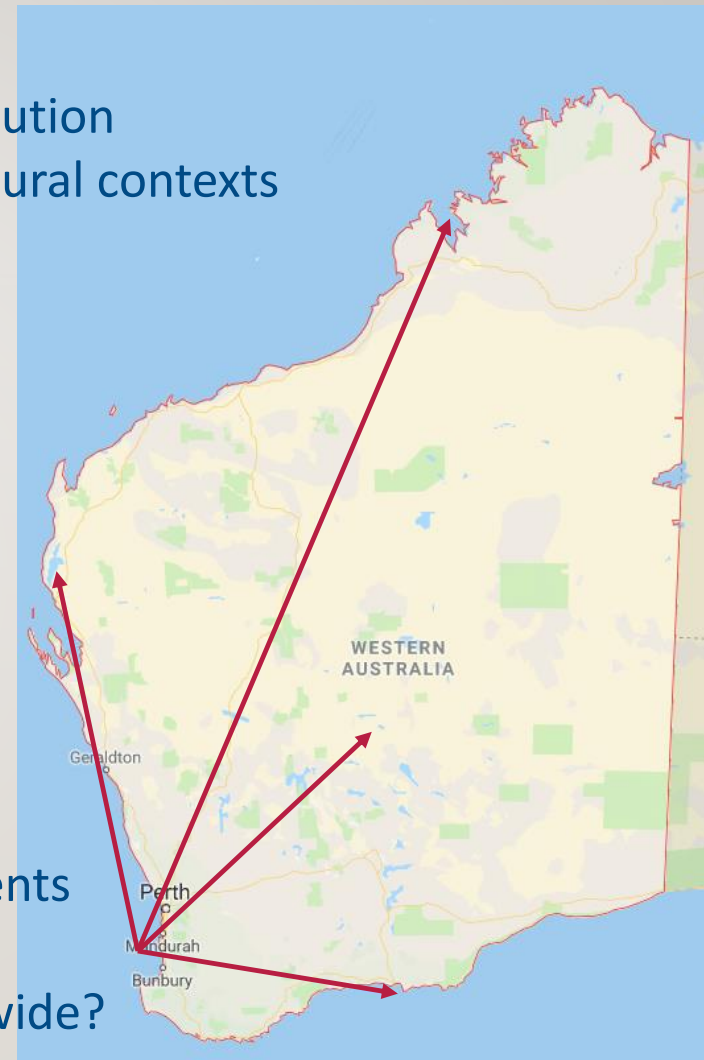
IEA TIMSS & PIRLS

AAMT Singapore Tour (April, 2019)



WA context

- International results must be interpreted with caution
 - Singapore and Australia have very different cultural contexts
 - It's hard to make meaningful comparisons
- We are both island nations
 - Singapore has an area of 719 km²
 - **Perth** has an area of 6418 km²
 - WA has an area of 2 646 000 km²
(~3700 x Singapore's)
 - WA population is about half of Singapore's
- WA challenges is to ensure equitable supply of quality PL & resources to teachers/schools/students (similar challenge facing QLD)
 - How do we ensure fair and even delivery statewide?



What does MAWA do?

Much the same as QAMT

Student Activities



Teacher PL



Publications & Resources



Have Sum Fun F2F Competition



problems

near level



Have Sum Fun Online

Interactive Maths Quiz for Schools



- An online version of Have Sum Fun endorsed by AAMT.
- HSFOL is an online quiz of NAPLAN-style problems for teams of four.
- Separate competitions are run for each year level, and are designed to foster mathematical problem solving for students in Years 3-10 across Australia.
- The competition consists of 3 rounds of 10 questions and is conducted over three weeks. Each round is accessible for one week. Teams can log on at any time during the week and have an hour to complete each round.
- All team members receive a participation certificate. The top 3 place-getters are shown in the League Table, and there are prize vouchers for each student in these teams: 1st Place = 4 x \$25, 2nd Place = 4 x \$15, and 3rd Place = 4 x \$10.
- To register, contact the MAWA office or simply register online.

Entry fees (per team, per term) are:

MAWA MEMBER/AFFILIATE SCHOOLS: **\$45** (including GST)

NON-MEMBER SCHOOLS: **\$58** (including GST)

WA Mathematics Problem Solving Program



- Originated by Dr Norm Hoffman in 1992



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 - Over 3500 students, many of whom are now doctors, engineers etc.
- Officially became a program of MAWA in 2016



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 - Over 3500 students, many of whom are now doctors, engineers etc.
- Officially became a program of MAWA in 2016
- Nathan Ford (CEO of AMT) has described the program as unique in Australia
 - AMT now sponsors WAMPSP expansion
 - The goal is to provide opportunities to more students through blended delivery and possibly replicating the WAMPSP program in other states
- Currently ~200 students
- First online cohort added in 2019
- Expanded face to face and online offerings from 2020
- <https://www.amt.edu.au/sandpit>



Primary and Secondary Conference

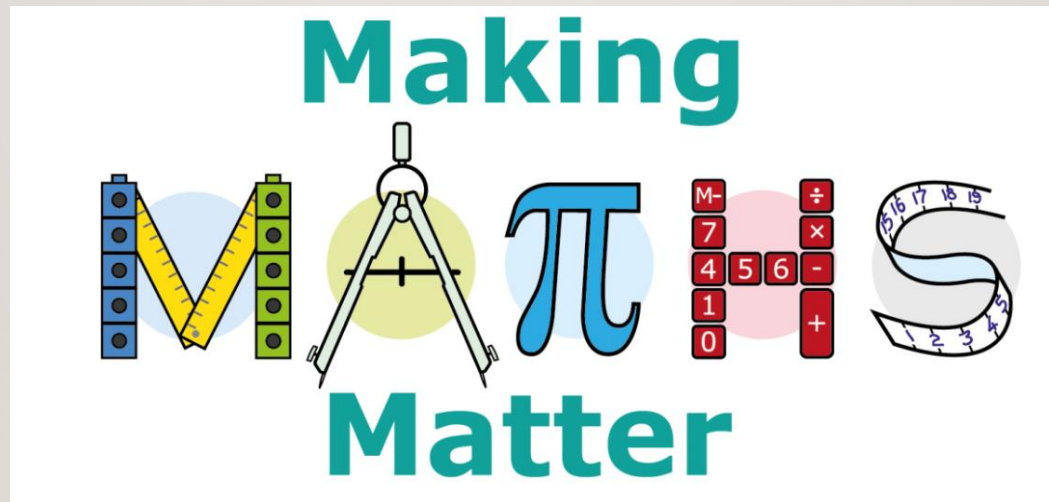


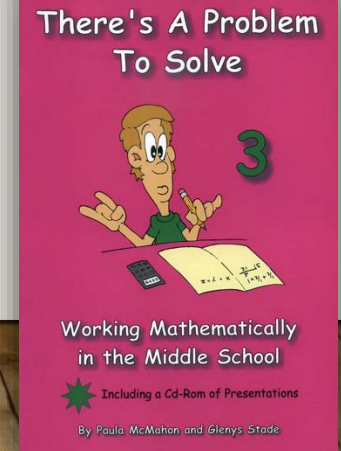
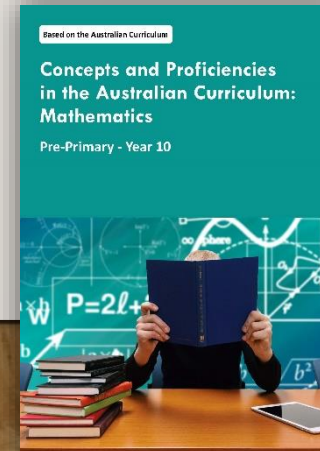
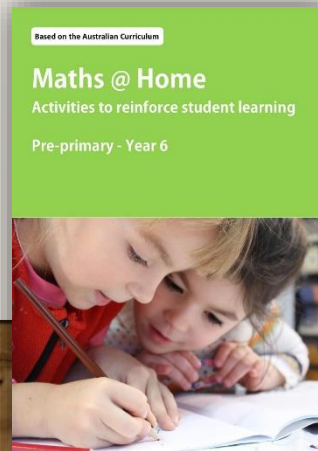
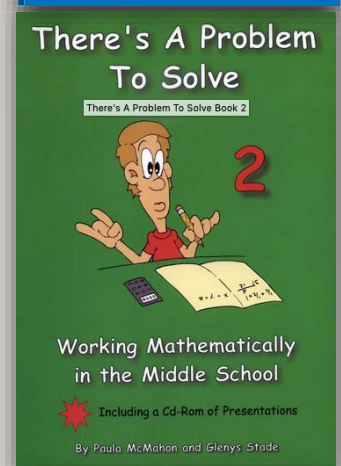
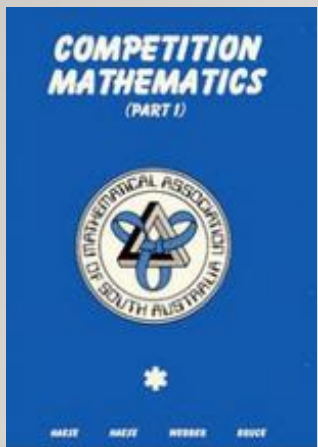
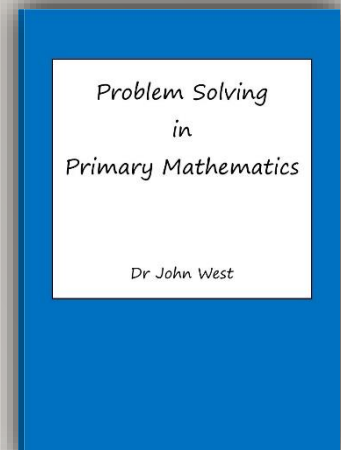
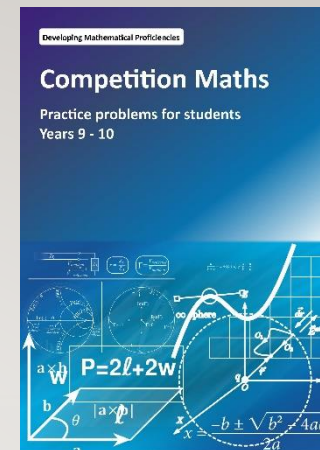
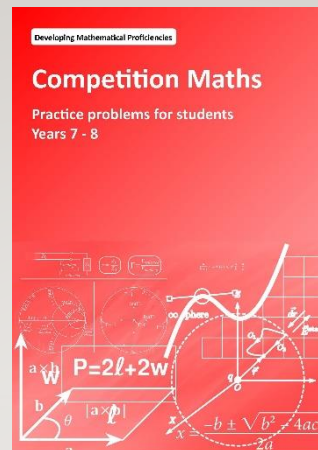
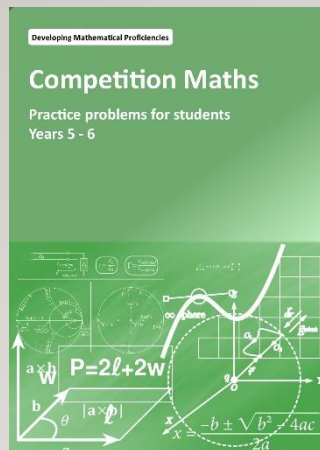
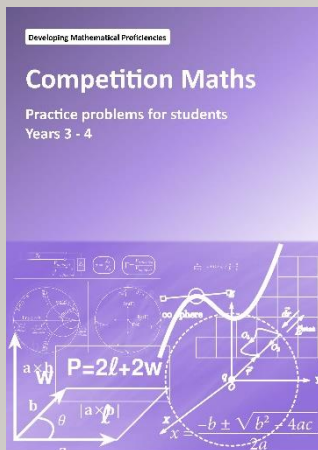
MAWA's annual conference is held at the Crown Convention Centre in November and each year and attracts over 1000 delegates!

(Note: Crown can accommodate up to 2000...)

The conference attracts presenters and delegates from interstate and overseas with an appetite for good food, good company and quality PD from local and national speakers such as Dr Paul Swan, Tierney Kennedy and Eddie Woo.

We promise to put on a warm welcome for our interstate and overseas guests!

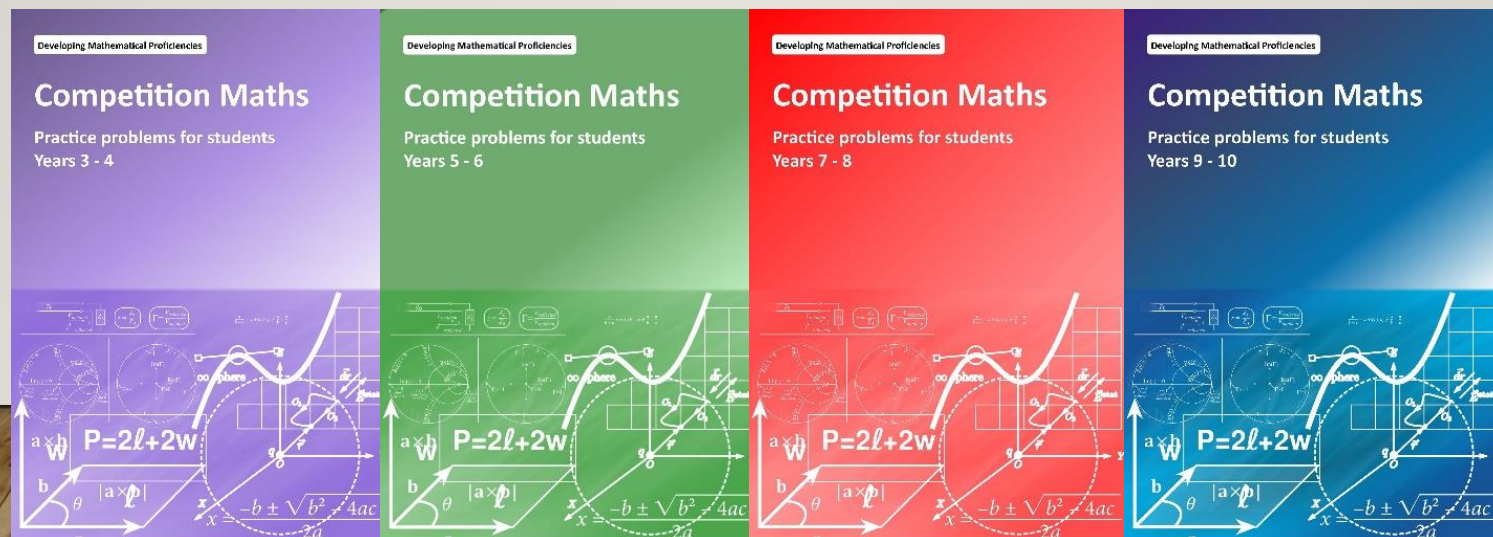




Competition Mathematics Resources



- Each Competition Mathematics book contains 128 problems arranged into 16 problem sets
- Practice problems are designed to help students prepare for competitions such as the Australian Mathematics Competition (AMC) and Have Sum Fun
- A set of four books designed for Year 3/4, 5/6, 7/8 and 9/10 students i.e., Middle Primary/Upper Primary/Junior and Intermediate divisions of AMC
- Available as **pdf blackline masters**



$\hat{11} = 34$
 $m \angle H$
 $I = \frac{L \times 10^3}{50T} = \frac{20A}{K}$
 $\frac{q^2 C_1^3}{3T} (Y \angle A) = \frac{2}{3} A$
 $\angle 90^\circ \sqrt{10 \cdot X}$
I'M A
MATH TEACHER
 $E = mc^2$
 $C = \pi r^2$
OF COURSE
I HAVE PROBLEMS.
 $\int \sqrt{e \cdot x} dx = A$
 $\nabla f(x, y, z) = \frac{\partial f}{\partial x} i + \frac{\partial f}{\partial y} j + \frac{\partial f}{\partial z} k$
 $\frac{1}{2} \sqrt{a^2 + b^2} + \frac{1}{2} \sqrt{a^2 + c^2} + C$
 $\frac{x_1 + x_2}{2}$

Problem Solving
in
Primary Mathematics

Dr John West

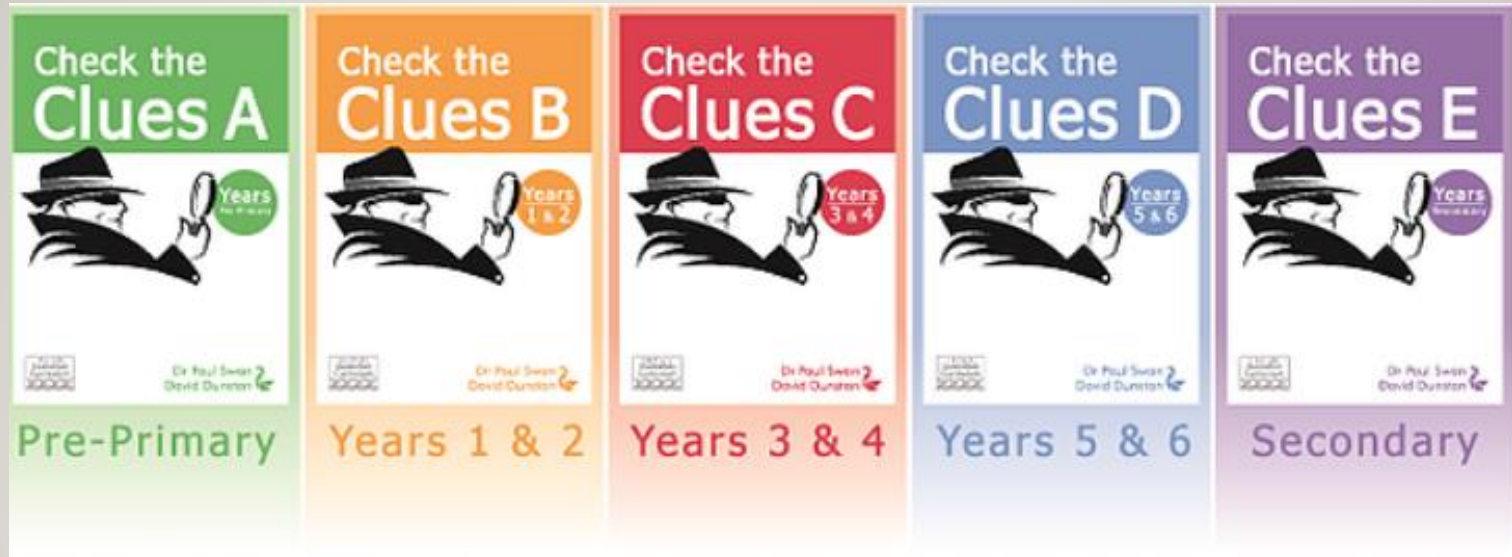
Normally \$30
Author direct

\$20

Finding problems

- 45 worked examples and 200 problems with solutions drawn from across the curriculum (120 pp, full colour)
- Each chapter focuses on a particular PS strategy
- Transfer of learning
- Purposefully teach PS strategies
- Thanks to Dr Paul Swan, this is known as the one with the s@#! cover
- Thanks to Peter Sullivan, I now have to write a new edition with **enabling** & **extending** prompts!

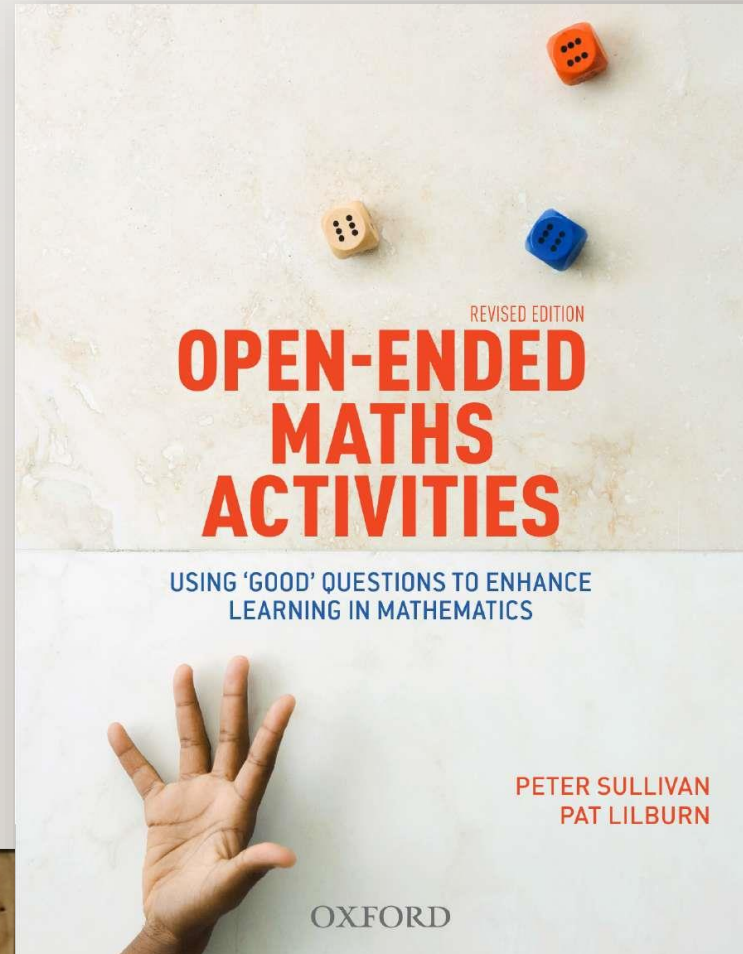
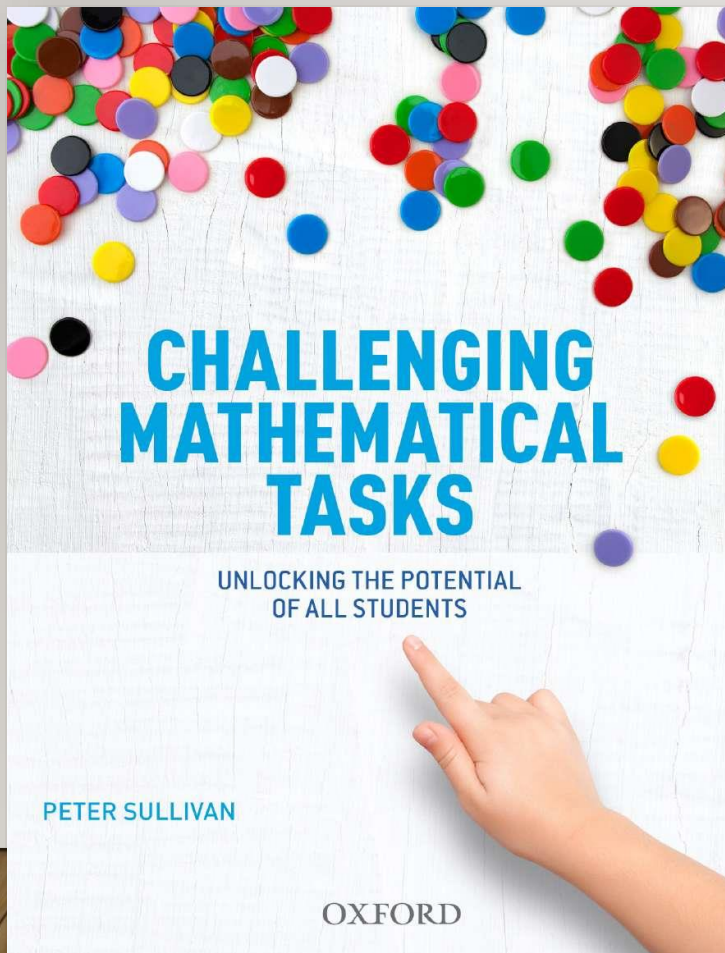
Resources for Collaborative Problem Solving



Dr Paul Swan & David Dunstan

Professor Peter Sullivan

- **Extending** and **enabling** prompts provide low-floor, high-ceiling tasks



CAN YOU SOLVE MY PROBLEMS?

A casebook of ingenious, perplexing
and totally satisfying puzzles



Which is the odd one out and why?*

ALEX BELLOS

Alex Bellos

- Author of
Alex's Adventures in Numberland
- Well-written
- Easy to read

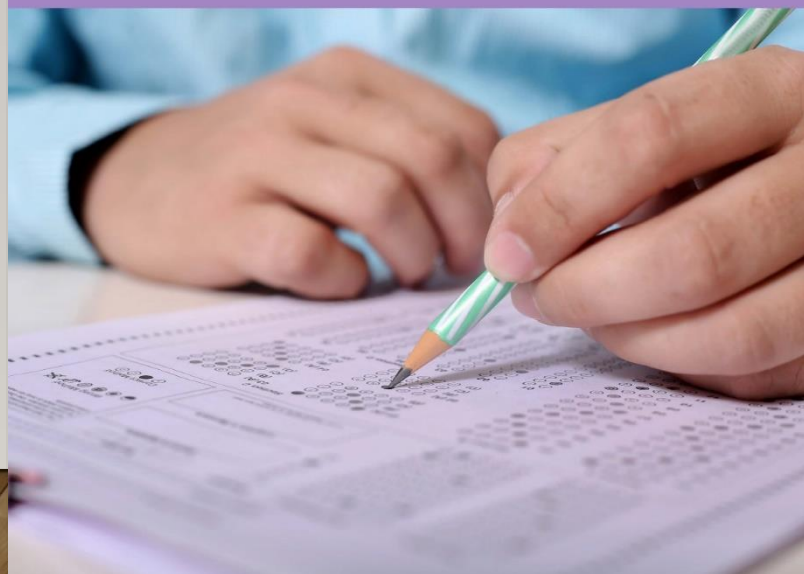
Available now... (mawainc.org.au)



Based on the Australian Curriculum

Puzzle Compendium

Simple mathematical games and puzzles
to develop Problem Solving & Reasoning



120 puzzles (64 pp.)

Includes:

- Area puzzles
- Block puzzles
- Kakuro
- KenKen
- Slitherlink
- Tatami
- Kakurasu
- Futoshiki
- Logi-5
- Ripple Effect ... & answers



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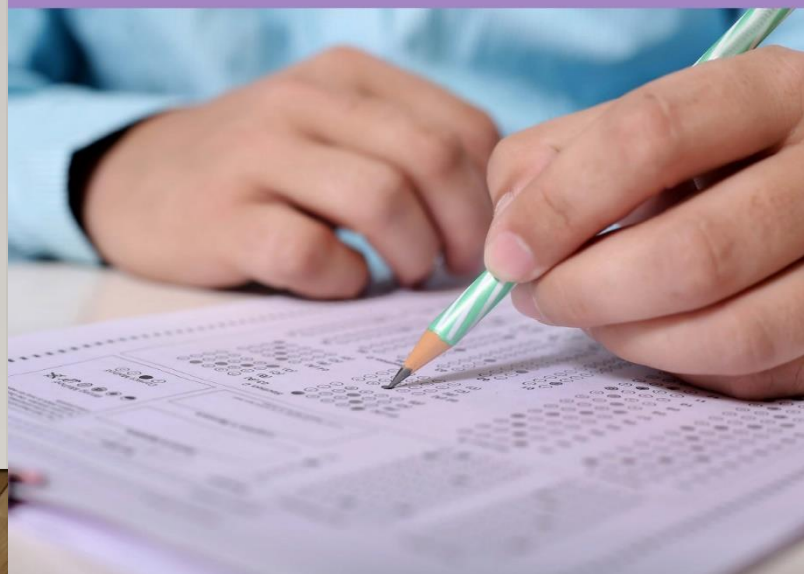
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Kennedy Press
& QAMT

\$15



Available now... Conference Discount



Based on the Australian Curriculum

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Simple mathematical games and puzzles to develop Problem Solving & Reasoning

STRICTLY LIMITED
(by the size of my suitcase!)

120 puzzles (64 pp.)

Includes:

- Area puzzles
- Kakurasu

• Kakurasu

• Futoshiki

• Logi-5

• Ripple Effect ... & answers

Conference
Exclusive
\$10

Available soon... Volume 2



Developing Mathematical Proficiencies

Puzzle Compendium 2

More mathematical games and puzzles
to develop Problem Solving & Reasoning



140 puzzles (64 pp.)

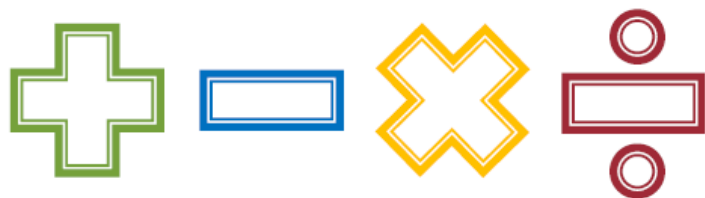
Including **20** all-new puzzles:

- Kuromasu
- Number Squares
- Meadows
- Rekuto
- Nurikabe
- Matrix
- Dosun Fuwari
- Walls
- Tenner Grids ... & answers



\$15

MATHEMATICS EDUCATION STARTER KIT



The **Mathematics Education Starter Kit** contains a range of teaching resources and activity ideas that address the essential mathematical content and proficiencies of the Australian Curriculum.

The resource was developed in conjunction with the Mathematical Association of Western Australia (MAWA) in order to provide support for pre-service and graduate teachers.

Caution: This kit contains small pieces.

DISCARD

- Equipment**
- 2 x 6-sided dice
 - A deck of cards (1s – 12s / A – 9, J, Q, K)

Instructions

Each player is dealt 8 cards. The remaining cards are placed on the table as the stock pile. Players take it in turns to roll two six-sided dice and to match cards from their hand to the numbers rolled in one of the following ways:

1. A single card may be matched to the sum of the two numbers rolled. Eg, if a 6 and a 2 are rolled, then the player can match an 8.
2. Two cards may be matched to the two numbers rolled on the dice. Eg, if a 1 and 4 are rolled, the player discards a 1 and a 4.
3. If the player has just one card remaining, they need only match it with one of the dice.
4. Each time a match is made, the player has another turn. If a player is unable to make a match during their turn, they must draw a card from the stock pile.
5. A player can inherit the dice roll from the previous player (this can be a good strategic move).

The winner of the game is the first player to **discard** all of their cards.



UnPrime

Equipment

- One counter for each player
- 2 x 6-sided dice

Instructions

Players take it in turns to roll the dice, adding or multiplying the two numbers.

They must then move their counter forward that number of spaces.

If they land on a prime number, they must move their counter back to the START!

START	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

POLYNGO

Materials

- A set of polyhedral dice
- A BINGO card

Instructions

Roll all of the polyhedral dice.

Use some (or all) of the numbers and the four operations to make numbers on the BINGO card.

The winner is the first player to make all of the numbers in a row, column or diagonal of their card. They need to record their calculations.



45	17	42	3
14	35	11	31
26	7	22	38
41	29	6	20

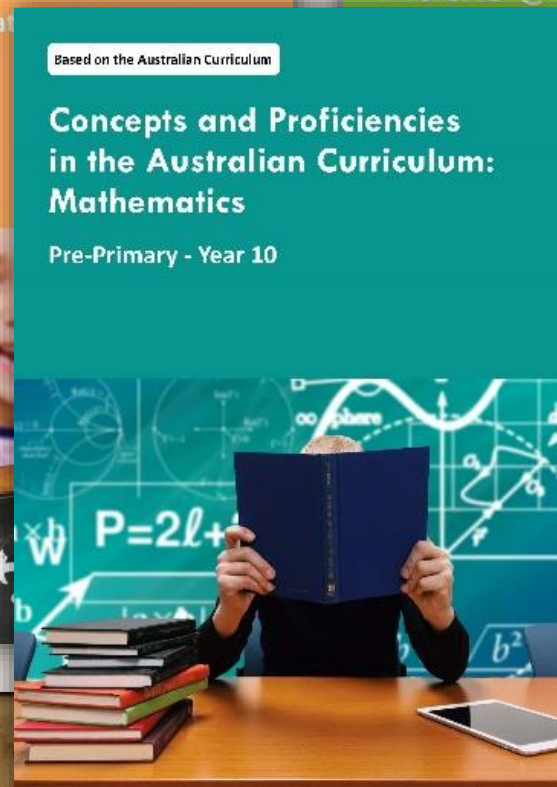
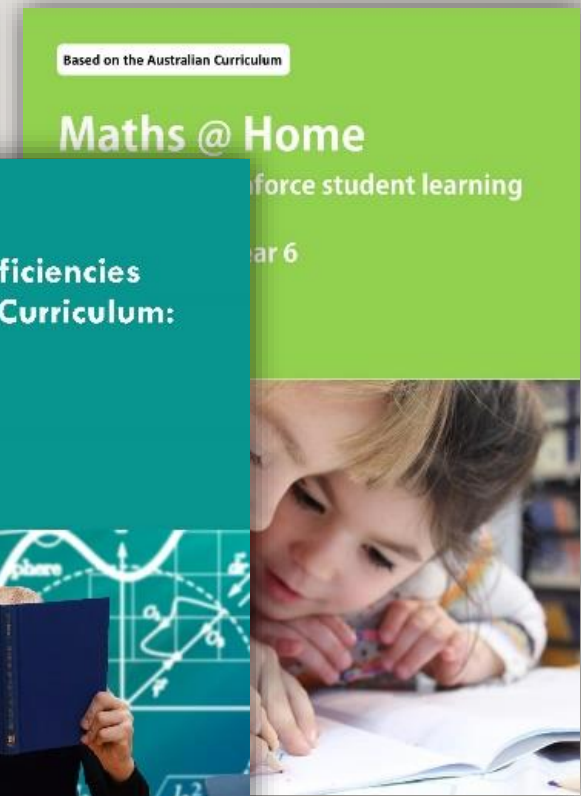
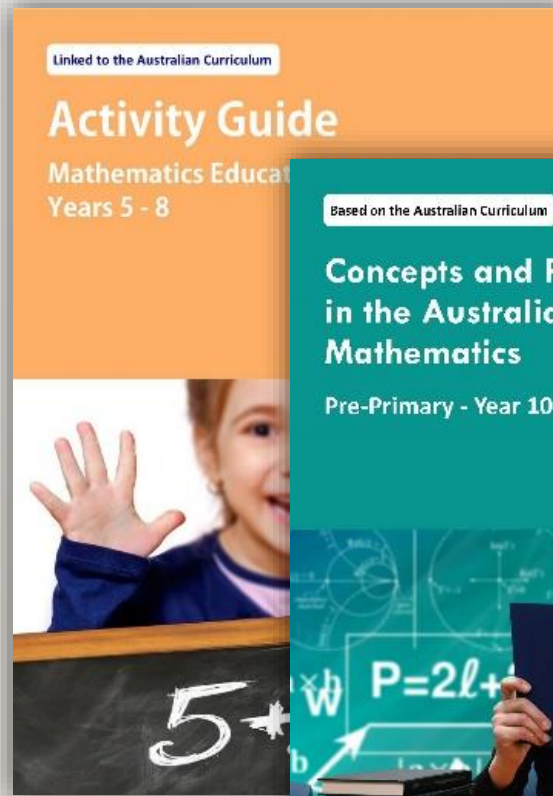
Starter Kit Bundles



Starter Kit: \$33 (inc. GST)

Kit + 1 book: \$40 (inc. GST)

Kit + 3 books: \$50 (inc. GST)



NOGGLE

Materials

9 dice

Instructions

Noggle is a number game that works the same way as the word game with the similar name. ☺

Roll the 9 dice and arrange them as a 3 x 3 array.

Players use some or all of the numbers and the four operations (i.e. +, -, x and ÷) to get as close to an agreed target (e.g. 50) as possible.

The first player to reach the target number **exactly** scores 10 points. If neither player reaches the target, the player who is closest receives 10 points minus the number they are away from the target.



Some Freebies

Number Thief!

The notorious number thief has struck again!

Three of the digits appear to have been stolen.

So far it seems that the digits that the digits taken have been selected at random.

Instructions

Roll three ten-sided dice to determine the three digits that have been stolen.

For example, the missing digits may be 2, 3 and 7.

If two or more dice show the same digit, then roll again.

Mathematicians are worried that other digits might go missing and so are hoping to be able to use the remaining digits to replace all of the numbers from 1 to 20 in case there's a national number shortage.



Example

Since 2 and 3 are missing, we can't do $3 - 2 = 1$ or $3 + 2 = 5$.

Fortunately, we can calculate $5 - 4 = 1$ and $6 - 1 = 5$.

Chicken Nugget Problem

The chicken nugget problem caused mathematicians a real stomach ache until they worked out that there is a maximum number of nuggets that cannot be purchased in a single transaction!

Say nuggets can only be bought in packs of 4 and/or 7.

What is the **largest** number it is impossible to buy?



Logi-5 (p. 25)

Logi-5 is played on a 5 x 5 grid. The aim is to place the letters A through E in each row and each column. Each of the bold cages should also contain the letters A through E.

PUZZLE 1

				D
	C			
A	B			

PUZZLE 2

	D			
A				
				E
C			B	

PUZZLE 3

		D		C
	E			
B				A

Ripple Effect (p. 28)

To complete the puzzle, place a digit in each of the empty cells so that each cage contains the digits 1 to 5 (where no two numbers are the same) and if the same digit appears more than once in the same row or column, they must be separated by that number of cells. That is, two 2s must be separated by 2 cells with other digits.

Example

2				1
4				2

Solution

2	1	3	4	2	1
1	2	1	3	4	2
3	4	2	1	3	1
2	1	4	2	1	3
1	2	3	1	2	1
4	1	2	3	1	2

No Four in a Row (p. 22)

Place either an 'X' or an 'O' into each of the empty squares in the grid so that no row, column or diagonal contains four consecutive 'X's or 'O's.

Example

X	O	X	X	O	X
		X			
X	X	O	X		X
X	O	X			X
O	X	X	X	X	
X	X		O	X	O
X			X	O	X
X	O	X	O	X	X

Solution

X	O	X	X	O	X
O	X	O	X	O	X
X	X	O	X		X
X	O	X			X
O	X	X	X	X	
X	X		O	X	O
X			X	O	X
X	O	X	O	X	X

Area Mazes (p. 5)

Area Mazes are the brainchild of legendary puzzle creator Masyu Isaka of Japan. The goal is to find the missing value denoted by the question mark. All Area Mazes can be solved using only whole numbers. The only mathematics that you need to know is that the area of any rectangle is equal to its length multiplied by its width.

Example

7 cm				

Solution

7 cm				

Kakurasu (p. 33)

Kakurasu is played on a square or rectangular grid. The aim is to shade cells in order to satisfy the horizontal and vertical clues. The clues down the left hand side and across the top of the grid give the total value of the shaded squares in that row or column, respectively. Note however that the first square in each row or column is worth 1 point, while the second is worth 2 points, the third 3 points, and so on.

Example

6	13	9	6	7	10
12					
11					
6					
14					
10					
6					

Solution

6	13	9	6	7	10
12					
11					
6					
14					
10					
6					

Marupeke (p. 39)

Marupeke is yet another logic puzzle from the mind of Masyu Isaka, the world's most prolific inventor of logic puzzles. The aim is to fill all of the empty cells in the grid with either an 'O' or an 'X' so that no more than two consecutive cells in any horizontal row, vertical column or diagonal contain the same symbol.

Example

Knossos (p. 35)

Knossos is played on a square or rectangular grid. The aim is to divide the playing grid into regions of various sizes, each of which contains a single number. The number contained in each of the regions must exactly equal the perimeter of that region.

Example

8	6	8			
8	4				
8	8				
10	8	8			
8	4	4			
4		8	6		

Solution

8	6	8			
8	4				
8	8				
10	8	8			
8	4	4			
4		8	6		

Futoshiki (p. 12)

The aim of Futoshiki puzzles is to fill in the squares so that each row and column contains all of the numbers from 1 to n , where n is the length and width of the grid. The greater than (>) and less than (<) symbols are used to show the relationship between the numbers contained in two squares that are adjacent to each other.

Example: 4 x 4 Futoshiki

Solution

3	1	4	2
4	2	3	1
1	4	2	3
2	3	1	4

Block Puzzle (p. 9)

Block puzzles are also known as Shikaku or Rectangles. The goal of the puzzle is to divide the large grid into square or rectangular blocks so that each block consists of the same number of small squares as the number contained inside that block.

Example: 5 x 5 Block

2				2
	3			
4				8
6				

Solution

2				2
	3			
4				8
6				

Slitherlink (p. 37)

Slitherlink, or using the code, is a logic puzzle in which the aim is to connect horizontally and vertically adjacent dots to form a single closed loop. The number inside a square represents how many of its four sides are segments in the loop.

Example

2	1	2			
3					
3	0		1	2	
3	2				
1		2			

Solution

2	1	2			
3					
3	0		1	2	
3	2				
1		2			

Puzzle Compendium

Example

4			3
1			2

Solution

4			3
1			2

Example

	4	2	3	3
2				
3				
4				
	c	3	d	

Solution

		4	2	3	3		
2	5	2	4	6	3	1	
	6	3	1	4	5	2	
3	4	5	3	1	2	6	
	3	1	6	2	4	5	
	2	6	5	3	1	4	
4	1	4	2	5	6	3	
	5	3		4			

Example

	5		
			5
3			
		4	

Solution:

	5		
			5
3			
	4		

Example

	A	B	A	B	C
A					
C					
B					
C					
B					
	C	A	B	C	A

Solution:

	A	B	A	B	C
A	A	B			C
C		C	A	B	
B	B	A	C		
C	C			A	B
B			B	C	A
	C	A	B	C	A

Example

3			4	
		2		
1				

Selling Point

3			4	
		2		
1				

Example

		2	
			1
0			
		3	
		2	

Solution

		2		3
			1	2
	0			
		3		1
		2		2

Example

Solution:

○	●		○
○	■		○
	○	●	●
●		●	■

Example

Solution:

Example

	7			
				4
	5			
7				
		4	3	

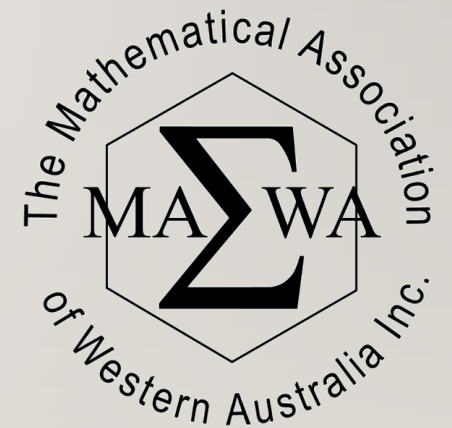
Solution

	7			
	5			
7				
		4	3	

Puzzle Compendium 2



Queensland
Association of
Mathematics
Teachers



POLYNGO

Materials

A set of polyhedral dice
A BINGO card

Instructions

Roll all of the polyhedral dice.



45	17	42	3
14	35	11	31
26	7	22	38
41	29	6	20

Use some (or all) of the numbers and the four operations to make numbers on the BINGO card.

The winner is the first player to make all of the numbers in a row, column or diagonal of their card. They need to record their calculations.

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14	35	~~11~~	~~31~~
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41	29	~~6~~	20

Use some (or all) of the numbers and the four operations to make numbers on the BINGO card.

The winner is the first player to make all of the numbers in a row, column or diagonal of their card. They need to record their calculations.

$$7 - 1 = 6$$

$$8 + 8 + 7 - 1 = 22$$

$$8 + 2 + 1 = 11$$

$$(8 + 8) \times 2 - 1 = 31$$

DISCARD

Equipment

- 2 x 6-sided dice
- A deck of cards (1s – 12s / A – 9, J, Q K)

Instructions

Each player is dealt 8 cards. The remaining cards are placed on the table as the stock pile. Players take it in turns to roll two six-sided dice and to match cards from their hand to the numbers rolled in one of the following ways:

1. A single card may be matched to the **sum** of the two numbers rolled
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The winner of the game is the first player to **discard** all of their cards.



UnPrime

Equipment

- One counter for each player
- 2 x 6-sided dice

Instructions

Players take it in turns to roll the dice, adding **or** multiplying the two numbers.

They must then move their counter forward that number of spaces.

If they land on a prime number, they must move their counter back to the **START**!

START	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	FINISH

NOGGLE

Materials

9 dice

Instructions

Noggle is a number game that works the same way as the word game with the *similar* name. 😊

Roll the 9 dice and arrange them as a 3 x 3 array.

Players use some or all of the numbers and the four operations (i.e. +, -, x and ÷) to get as close to an agreed target (e.g. 50) as possible.

The first player to reach the target number **exactly** scores 10 points. If neither player reaches the target, the player who is closest receives 10 points minus the number they are away from the target.



POWERBALL NOGGLE

Materials

9 dice

Instructions

Noggle is a number game that works the same way as the word game with the *similar* name. 😊

Roll the 9 dice and arrange them as a 3 x 3 array.

Players use some or all of the numbers and the four operations (i.e. +, -, $\times$ and $\div$) to get as close to an agreed target (e.g. 50) as possible.

In this variation, players **must** use the number on the central die. **Hint:** Use a different colour die so players cannot simply move any number to the centre.



Chicken Nugget Problem

The chicken nugget problem caused mathematicians a real stomach ache until they worked out that there is a maximum number of nuggets that cannot be purchased in a single transaction!

Say nuggets can only be bought in packs of 4 and/or 7.

What is the **largest** number it is impossible to buy?



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Say nuggets can only be bought in packs of 4 and/or 7.

What is the **largest** number it is impossible to buy?

Clearly it is **not** possible to purchase 1, 2 or 3 nuggets.

It is also **not** possible to purchase 5 or 6.

It is possible to purchase 8 nuggets but **not** 9 or 10.

It is possible to purchase 11 or 12 nuggets, but **not** 13.

It is possible to purchase 14 nuggets, but **not** 15.

It is possible to purchase 16 nuggets, but **not** 17.

It is possible to purchase 18, 19, 20 or 21 nuggets...



Number Thief!

The notorious number thief has struck again!

Three of the digits appear to have been stolen.

So far it seems that the digits that the digits taken have been selected at random.

Instructions

Roll three ten-sided dice to determine the three digits that have been stolen.

For example, the missing digits may be 2, 3 and 7.

If two or more dice show the same digit, then roll again.

Mathematicians are worried that other digits might go missing and so are hoping to be able to use the remaining digits to replace all of the numbers from 1 to 20 in case there's a national number shortage.



Example

Since 2 and 3 are missing, we can't do $3 - 2 = 1$ or $3 + 2 = 5$.

Fortunately, we can calculate $5 - 4 = 1$ and $6 - 1 = 5$.

Logi-5 (p. 25)

Logi-5 is played on a 5 x 5 grid. The aim is to place the letters A through E in each row and each column. Each of the bold cages should also contain the letters A through E.

PUZZLE 1

				D
	C			
				E
A		B		

PUZZLE 2

	D			
A				
				E
C			B	

PUZZLE 3

		D		C
	E			
B				
			A	

Ripple Effect (p. 28)

To complete the puzzle, place a digit in each of the empty cells so that each cage contains the digits 1 to n (where n is the number of cells in the cage) and if the same digit appears more than once in the same row or column, they must be separated by that number of cells. That is, two 3s must be separated by 3 cells with other digits.

Example

2					1
4					2

Solution

2	1	3	4	2	1
1	2	1	3	4	2
3	4	2	1	3	1
2	1	4	2	1	3
1	2	3	1	2	1
4	1	2	3	1	2

No Four in a Row (p. 22)

Place either an 'X' or an 'O' into each of the empty squares in the grid so that no row, column or diagonal contains four consecutive 'X's or 'O's.

Example

X	O		X	X	X	O	X
			X				X
X	X	O	X		X		X
X	O	X	O			X	O
	O		X		X		X
X	X			O	X		O
X			X	O	X	O	X
X	O	O	X	X	O	X	X

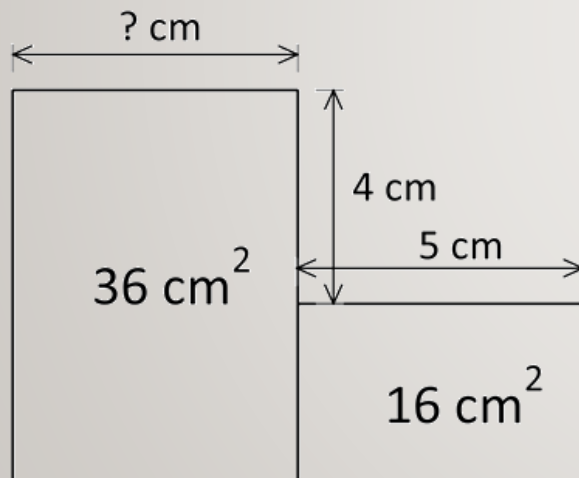
Solution

X	O	O	X	X	X	O	X
O	X	O	X	O	X	O	X
X	X	O	X	O	X	X	X
X	O	X	O	X	O	X	O
O	O	X	X	O	X	X	X
X	X	O	O	O	X	O	O
X	O	X	X	O	X	O	X
X	O	O	X	X	O	X	X

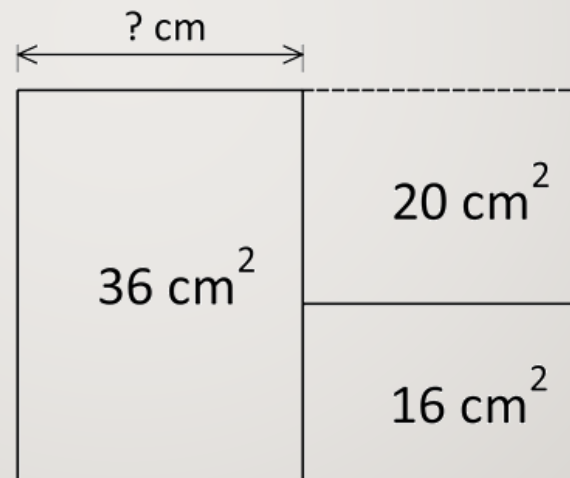
Area Mazes (p. 5)

Area Mazes are the brainchild of legendary puzzle creator Naoki Inaba of Japan. The goal is to find the missing value denoted by the question mark. All Area Mazes can be solved using only whole numbers. The only mathematics that you need to know is that the area of any rectangle is equal to its length multiplied by its width.

Example



Solution



Since both the left and right rectangles are equal in both height and area, they are also the same width (i.e., 5 cm).

Kakurasu (p. 33)

Kakurasu is played on a square or rectangular grid. The aim is to shade cells in order to satisfy the horizontal and vertical clues. The clues down the left-hand side and across the top of the grid give the total **value** of the shaded squares in that row or column, respectively. Note however that the first square in each row or column is worth 1 point, while the second is worth 2 points, the third 3 points, and so on.

Example

	6	13	9	6	7	10	
12							1
13							2
6							3
14							4
6							5
6							6
	1	2	3	4	5	6	

Solution

	6	13	9	6	7	10	
12							1
13							2
6							3
14							4
6							5
6							6
	1	2	3	4	5	6	

Marupeke (p. 39)

Marupeke is yet another logic puzzle from the mind of Naoki Inaba, the world's most prolific inventor of logic puzzles. The aim is to fill all of the empty cells in the grid with either an O or an X so that **no more than two** consecutive cells in any horizontal row, vertical column or diagonal contain the same symbol.

Example

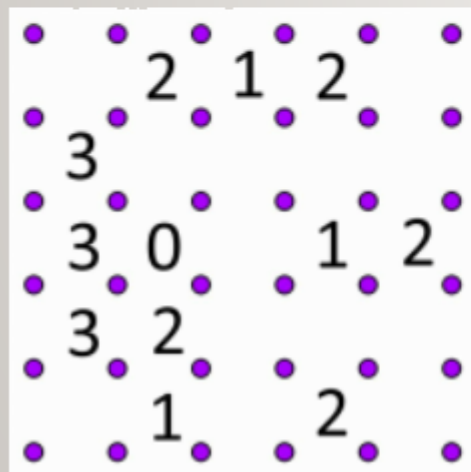
Notice that if we were to place an O between the two Os on the grid, we would have a diagonal run of three, which is not permitted. Therefore we place an X in this square as shown.

			X
	O		
X			
			O

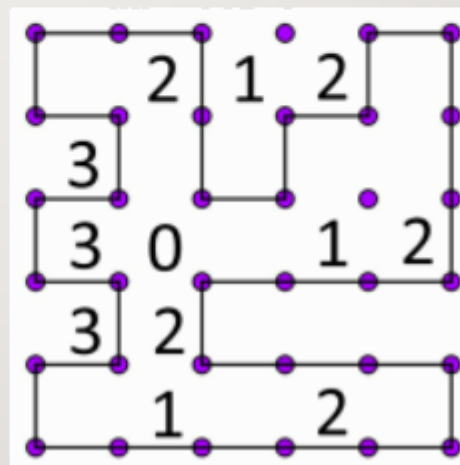
Slitherlink (p. 37)

Slitherlink, or Loop the Loop, is a logic puzzle in which the aim is to connect horizontally and vertically adjacent dots to form a single closed loop. The number inside a square represents how many of its four sides are segments in the loop.

Example



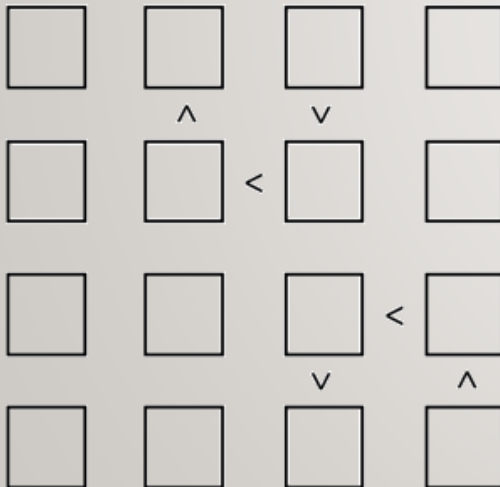
Solution



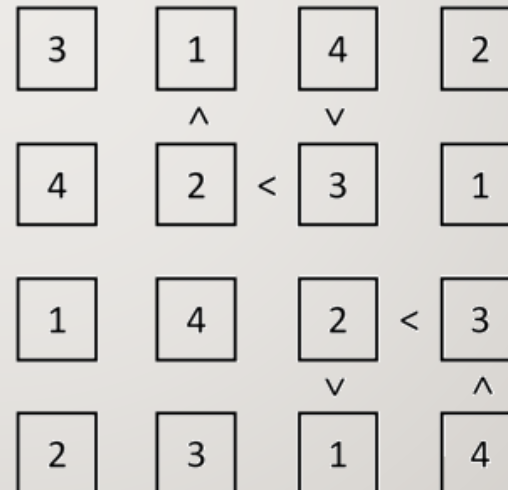
Futoshiki (p. 12)

The aim of Futoshiki puzzles is to fill in the squares so that each row and column contains all of the numbers from 1 to n , where n is the length and width of the grid. The *greater than* ($>$) and *less than* ($<$) symbols are used to show the relationship between the numbers contained in two squares that are adjacent to each other.

Example: 4 x 4 Futoshiki



Solution



Block Puzzle (p. 9)

Block puzzles are also known as Shikaku or Rectangles. The goal of the puzzle is to divide the large grid into square or rectangular blocks so that each block consists of the same number of small squares as the number contained inside that block.

Example: 5 x 5 Block

	2			2
		3		
	4			8
	6			

Solution

	2			2
		3		
	4			8
	6			

Knossos (p. 35)

Knossos is played on a square or rectangular grid. The aim is to divide the playing grid into regions of various sizes, each of which contains a single number. The number contained in each of the regions must exactly equal the perimeter of that region.

Example

	8		6	8			
				4	8		
8		4		10			8
8	8			6			4
	8		8		8		
	10			8		10	
	8			4	4		
		4			8	6	

Solution

	8		6	8			
				4	8		
8		4		10			8
8	8			6			4
	8		8		8		
	10			8		10	
	8			4	4		
		4			8	6	

Peintopointo (p. 5)

The aim of Peintopointo (or 'Paint Point') is to shade cells to divide the grid into areas of white cells. Each white area contains one number, which equals the number of cells it contains. White areas must not be connected orthogonally, but may touch diagonally.

Example

4			3
1			2

Solution

4			3
1			2

Skyscrapers (p. 8)

The goal of Skyscrapers is to fill in each cell with numbers from 1 to N, where N is the size of the puzzle grid. Digits may not be repeated in any row or column. The numbers outside the grid indicate the number of buildings you would see if looking towards buildings with heights equal to the numbers in that row or column.

Example

		4	2		3	3	
2							
3							
							3
4							2
	5		3			4	

Solution

		4	2		3	3	
2	5	2	4	6	3	1	
	6	3	1	4	5	2	
3	4	5	3	1	2	6	
	3	1	6	2	4	5	
	2	6	5	3	1	4	3
4	1	4	2	5	6	3	2
	5		3			4	

Rekuto (p. 10)

The aim of Rekuto is to divide the playing grid into square or rectangular regions, each containing one number that equals the sum of the rectangle's width and height.

Example

	5		
			5
3			
		4	

Solution

	5		
			5
3			
	4		

Easy As ABC (p. 18)

The aim of this game is to place the letters A, B and C exactly once in each row and column. There are two empty cells in each row and column. The letters placed outside the grid indicate which letter appears closest to that end of the row or column. Variations of this puzzle include versions with A – D or A – E (see Puzzles 10 – 12).

Example

	A	B	A	B	C	
A						C
C						B
B						C
C						B
B						A
	C	A	B	C	A	

Solution

	A	B	A	B	C	
A	A	B			C	C
C		C	A	B		B
B	B	A	C			C
C	C			A	B	B
B			B	C	A	A
	C	A	B	C	A	

Mochikoro (p. 20)

Mochikoro is a logic puzzle played on a grid which contains some numbers squares. The aim is to shade some of the cells according to the following rules:

- The black cells divide the grid into rectangular areas of white cells called islands
- No islands share an edge, but all islands share at least one corner
- Each numbered cell is part of a white island, but there may be some white areas that do not include a cell with a number
- Each island has the same number of white cells as the number it contains
- There are no 2 x 2 regions containing all black cells.

Example

3			4	
		2		
1				

Solution

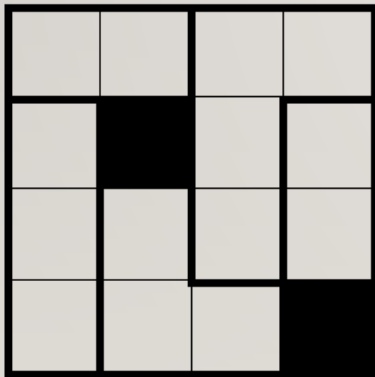
3			4	
		2		
1				

Dosun Fuwari (p. 24)

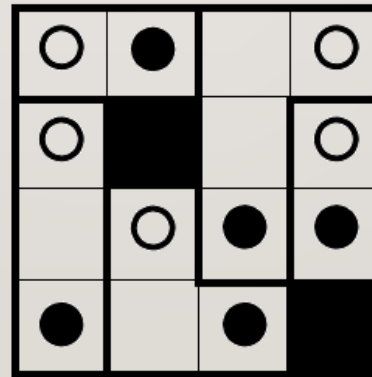
Dosun-Fuwari is a logic puzzle in which the aim is to place balloons (white circles) and iron balls (black circles) in the grid according to the following rules.

- Each cage must contain one balloon and one iron ball.
- Balloons float upwards so can only be placed in one of the cells at the top, under a black square or under other balloons.
- Iron balls sink so must be placed in one of the cells at the bottom, in a cell over a black square or on top of other iron balls.

Example



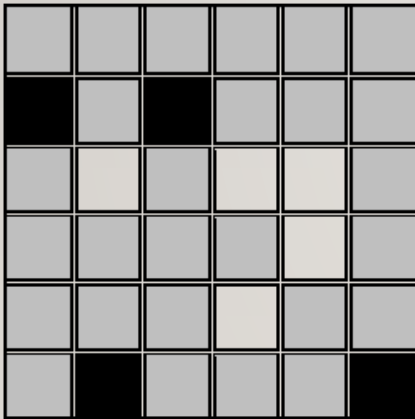
Solution



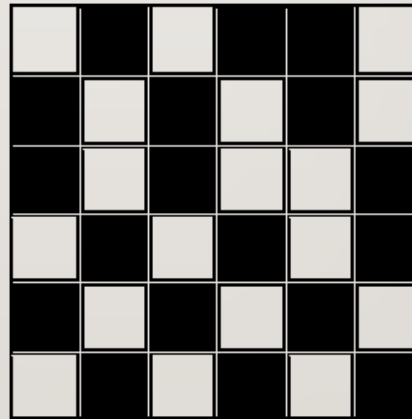
No Three in a Row (p. 14)

The aim of this simple logic puzzle is to fill the grid with black and white squares without having 3 squares of the same colour in a row either horizontally or vertically. Each of the rows and columns contains an equal number of black and white squares.

Example



Solution



Example

			3
	8		
3			3

Five Cells (p. 23)

The aim of five cells is to divide the grid into regions, each of which contains exactly five cells. The numbers contained in the cells indicate how many of that cell's sides are part of the border of the grid or the region. There can be up to 5 cells containing numbers in any region. The borders surround the cells and do not enter the regions.

Example

		2		3
			1	2
	0			
		3		1
		2		2

Solution

		2		3
			1	2
	0			
		3		1
		2		2

Kuromasu (p. 12)

The aim of this puzzle is to shade some cells according to the following rules:

- The number in any cell is the number of unshaded cells that can be seen from that position, including the cell itself
- It is not possible to see through the shaded cells
- Cells that contain numbers cannot be shaded
- Shaded cells cannot touch, except diagonally
- The unshaded cells form a continuous path; it is possible to travel between any of the unshaded cells by moving only horizontally and/or vertically.

Example

	7			
				4
	5			
7				
		4	3	

Solution

	7			
				4
	5			
7				
		4	3	