

Perplexing Puzzles Years 7-8

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Perplexing Puzzles Staircases

1

Complete this table:

Add the numbers in each line.

For example,

- the first line adds up to 1,
- the second line adds up to 8,
- the third line adds up to 27.

You may recognise these as special numbers.

- Look for a pattern?
- How could you work out the total of the 10th line?
- What is the rule for working out the total of any line?

Row

1	1					
2	3	5				
3	7	9	11			
4	13	15	17	19		
5	21	23	25	27	29	
6	31	33	35	37	39	41

Total

1	$\rightarrow 1^3$
8	$\rightarrow 2^3$
27	$\rightarrow 3^3$

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Perplexing Puzzles Staircases 2

2

Complete this table.

Add the numbers in each line.

For example,

- the first line adds up to 0,
- the second line adds up to 6,
- the third line adds up to 24.

You may notice a connection between the number in the staircase and the numbers on the previous staircase.

- Look for a pattern?
- How could you work out the total of the 10th line?
- What is the rule for working out the total of any line?

Row

1	0					
2	2	4				
3	6	8	10			
4	12	14	16	18		
5	20	22	24	26	28	
6	30	32	34	36	38	40
7						
8						

Total

0
6
24
60

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ANSWERS TO PREVIOUS PUZZLES:

1. The rule for working out the total of any line is the row number cubed.
2. The rule for working out the total of any line is the row number cubed, subtract the row number.

Perplexing Puzzles

Multiplication Shortcuts 1

3

To square a two-digit number ending in 5
e.g. 45.

Square the tens digit.

Add the tens digit to that product.

The last two digits will always be 25 so the
answer is **2025**.

Try some other two-digit numbers ending
in 5.

Try to explain why this shortcut works.

e.g. $4 \times 4 = 16$

$$4 + 16 = 20$$

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Perplexing Puzzles

Multiplication Shortcuts 2

4

To square the “fifty numbers” (e.g. 56), the
first two digits are found by adding 25 to
the units digit.

The remaining two digits are found by
squaring the units digit.

Therefore the answer is **3136**.

Try squaring some other “fifty numbers”
this way.

Try to explain why this works.

e.g. $25 + 6 = 31$

$$6 \times 6 = 36$$

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