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ANSWERS

lift-out in centre of book

Number grids

In these grids, the sum of each row and each column has been given. What numbers must be placed in the empty boxes to make these sums? Before you start, study the worked example.

	3	8
		5
7	6	

This number must be 5, as $5 + 3 = 8$.

This number must be 3, as $3 + 3 = 6$.

Now look at the second row:

$$\square + 3 = 5 \text{ and } 5 + \square = 7$$

so $\square = 2$

Here is the solution:

5	3	8
2	3	5
7	6	

1

3		7
		6
4	9	

2

	3	5
		9
4	10	

3

	2	9
		7
10	6	

4

5		10
		7
9	8	

5

		7
4		10
8	9	

6

7		9
		8
10	7	

7

		12
3		7
9	10	

8

	2	10
		6
9	7	

9

	4	12
		7
11	8	

10

		10
4		9
13	6	

11

	7	14
		17
15	16	

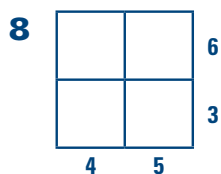
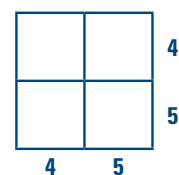
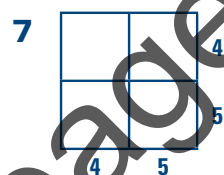
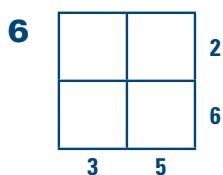
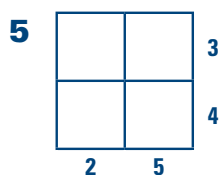
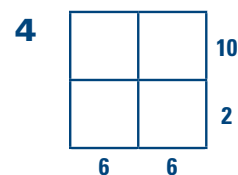
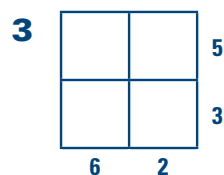
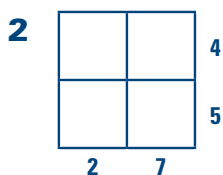
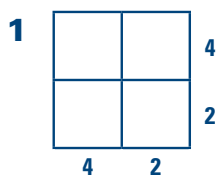
12

	8	15
		13
14	14	

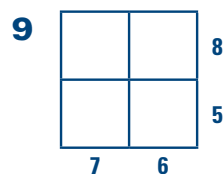
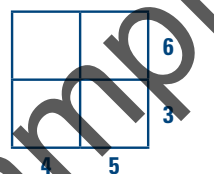
Sample pages

Grid puzzles

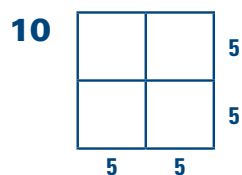
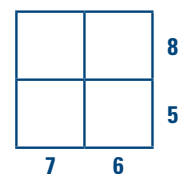
In these grids, only the sum of each row and column is given. Using only the counting numbers, which are 1, 2, 3, 4 and so on, work out which numbers should be placed in the small empty squares. The last six questions have more than one solution. Find two different solutions.



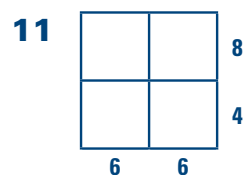
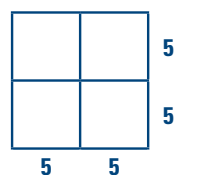
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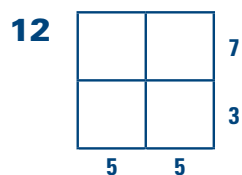
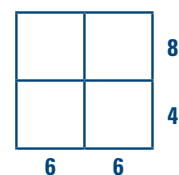
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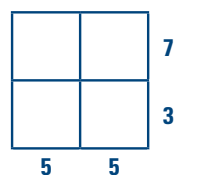
or



or



or



Missing numbers

In each set of circles, the numbers follow a certain pattern. The arrows in the first circle of each set show how the numbers should be read. What numbers are missing from the last two circles in each set? Write the rules on the small circle on the left.

1 **RULE**

+ 1

10	8	4	5	13
9	7	3	4	
11	9	5		14

2

+ 3

4	5	9	6	10
1	2	6	3	
7	8	12		13

3

4	10	6	12	8
8	20	12		
2	5	3	24	4

4

5	4	8	3	
3	2	6	1	
7	6	10		12

5

11	8	14	19	
12	9	15		
10	7	13	18	16

6

8	18	10	9	
12	22	14	13	
4	14	6		7

7

2	4	10	8	6
1	2	5	4	
4	8	20		12

8

6	9	15	3	12
2	3	5	1	
18	27	45		

Number sentences

In this exercise you will use only the numbers 2, 3, 4, 5 and 6.

Using any three different numbers in each one, complete the number sentences below.

Here is an example:

$$\underline{\quad} + \underline{\quad} - \underline{\quad} = 6$$

$$4 + 5 - 3 = 6$$

This is one correct solution. Can you find another?

Remember: You must not use any counting number more than once in each number sentence.

1 $\underline{\quad} + \underline{\quad} + \underline{\quad} = 9$

2 $\underline{\quad} + \underline{\quad} - \underline{\quad} = 9$

3 $\underline{\quad} + \underline{\quad} - \underline{\quad} = 2$

4 $\underline{\quad} + \underline{\quad} - \underline{\quad} = 4$

5 $\underline{\quad} + \underline{\quad} + \underline{\quad} = 10$

6 $\underline{\quad} + \underline{\quad} = 11$

7 $\underline{\quad} - \underline{\quad} - \underline{\quad} = 1$

8 $\underline{\quad} - \underline{\quad} = 0$

9 $\underline{\quad} - \underline{\quad} + \underline{\quad} = 3$

10 $\underline{\quad} \times \underline{\quad} + \underline{\quad} = 10$

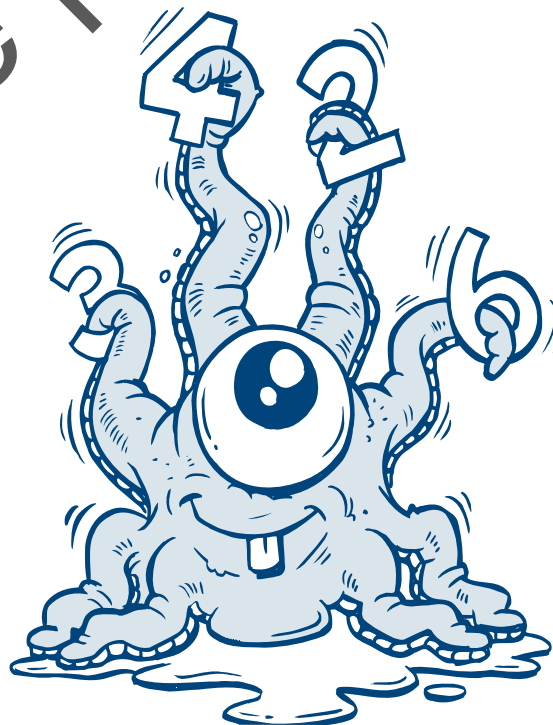
11 $\underline{\quad} \times \underline{\quad} - \underline{\quad} = 7$

12 $\underline{\quad} \times \underline{\quad} - \underline{\quad} = 2$

13 $\underline{\quad} \times \underline{\quad} - \underline{\quad} = 0$

14 $\underline{\quad} \times \underline{\quad} - \underline{\quad} = 3$

15 $\underline{\quad} \times \underline{\quad} + \underline{\quad} = 11$



Sample pages



Some of the sentences have more than one possible solution. How many can you find?

Number ideas

Use any combination of the symbols +, - and \times to make the groups of numbers given below into true statements.

For example, if you are given the numbers 1 4 3 = 1, you will need the symbols \times and - to make a number sentence:

$$1 \times 4 - 3 = 1$$

Remember: You must work out brackets first, and multiply (\times) before you add (+) or subtract (-):

$$1 + \underbrace{(2 \times 3)}_{\text{(First)}} = 1 + 6 = 7$$

$$\underbrace{(1 + 2)}_{\text{(First)}} \times 3 = 3 \times 3 = 9$$

1 1 2 3 = 0

2 1 3 2 = 1

3 1 3 2 = 2

4 2 3 1 = 4

5 2 3 1 = 5

6 1 2 3 = 6

7 1 3 4 = 7

8 2 4 6 = 0

9 2 4 6 = 2

10 2 3 5 = 1

11 2 5 6 = 4

12 2 5 1 = 9

13 2 4 3 = 5

14 6 2 4 = 8

15 2 6 4 = 4

16 2 4 5 = 3

17 2 3 1 = 7

18 2 5 2 = 12

19 2 5 2 = 8

20 2 6 5 = 7

Numbers and symbols

In the questions below, use the numbers indicated and any combinations of the symbols +, -, ×, ÷ and brackets to make number sentences for the numbers below.

Remember the order of operations:

- brackets first;
- multiply and divide before add and subtract.

1 Use four 2s. Here are some examples.

$$\begin{aligned} 2 + 2 \times 2 - 2 &= 2 + 4 - 2 \\ &= 4 \end{aligned}$$

$$\begin{aligned} (2 + 2) \times 2 - 2 &= 4 \times 2 - 2 \\ &= 8 - 2 \\ &= 6 \end{aligned}$$

and

$$\begin{aligned} 2 + 2 \times (2 - 2) &= 2 + 2 \times 0 \\ &= 2 + 0 \\ &= 2 \end{aligned}$$

0 = _____ 1 = _____
3 = _____ 5 = _____
8 = _____ 10 = _____

2 Use three 3s. Here are some examples.

Remember the order of operations:

$$(3 - 3) \times 3 = 0 \text{ (brackets first)}$$

$$3 - 3 \div 3 = 3 - 1 \text{ (divide before subtract)}$$

$$\begin{aligned} 3 + 3 \times 3 &= 3 + 9 \text{ (multiply before add)} \\ &= 12 \end{aligned}$$

$$= 2$$

0 = _____ 3 = _____
4 = _____ 6 = _____
9 = _____ 18 = _____

3 Use four 3s. Here are some examples.

$$\begin{aligned} 3 + 3 \div 3 + 3 &= 3 + 1 + 3 \\ &= 7 \end{aligned}$$

$$\begin{aligned} (3 + 3) \div 3 + 3 &= 6 \div 3 + 3 \\ &= 2 + 3 \\ &= 5 \end{aligned}$$

and

$$\begin{aligned} (3 + 3) \div (3 + 3) &= 6 \div 6 \\ &= 1 \end{aligned}$$

0 = _____ 2 = _____
3 = _____ 6 = _____
9 = _____ 10 = _____

Square puzzles

In this exercise, you will use only the numbers 1, 2, 3, 4 and 5.

Using the sums of the rows and columns given for these divided squares, work out the values of the letters A, B, C and D and write your solutions in the blank grids provided.

Note that the letters each have a different value and are different for each question.

You will have to use the method of 'guess and check' for questions 7 to 10.

1

A	B	5
A	C	6
4	7	

		5
		6
4	7	

A = _____
B = _____
C = _____

2

A	B	5
C	C	6
4	7	

		5
		6
4	7	

A = _____
B = _____
C = _____

3

A	C	3
B	B	6
5	4	

		3
		6
5	4	

A = _____
B = _____
C = _____

4

C	B	5
A	B	4
7	2	

		5
		4
7	2	

A = _____
B = _____
C = _____

5

A	A	10
B	C	4
6	8	

		10
		4
6	8	

A = _____
B = _____
C = _____

6

A	C	7
A	B	6
8	5	

		7
		6
8	5	

A = _____
B = _____
C = _____

7

B	C	4
A	D	6
3	7	

		4
		6
3	7	

A = _____
B = _____
C = _____
D = _____

8

A	B	5
C	D	6
3	8	

		5
		6
3	8	

A = _____
B = _____
C = _____
D = _____

9

A	C	6
B	D	8
5	9	

		6
		8
5	9	

A = _____
B = _____
C = _____
D = _____

10

A	B	6
D	C	7
8	5	

		6
		7
8	5	

A = _____
B = _____
C = _____
D = _____

Find my rule

In each question, there is a set of boxes. Every box follows the same rule. Find the rule, write it down, and then use it to work out which numbers are missing from the last box.

The rule for question 1 is 'Subtract 3 from the first number and double the answer', written $-3, \times 2$.

	RULE			
1	-3 $\times 2$ 9 → 6 → 12	-3 $\times 2$ 10 → 7 → 14	-3 $\times 2$ 8 → 5 → 10	<input type="text"/> <input type="text"/> 5 → 2 → <input type="text"/>
2	<input type="text"/> <input type="text"/> 3 → 7 → 14	<input type="text"/> <input type="text"/> 5 → 9 → 18	<input type="text"/> <input type="text"/> 4 → 8 → 16	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → <input type="text"/>
3	<input type="text"/> <input type="text"/> 5 → 10 → 3	<input type="text"/> <input type="text"/> 8 → 16 → 9	<input type="text"/> <input type="text"/> 7 → 14 → 7	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 10
4	<input type="text"/> <input type="text"/> 8 → 17 → 13	<input type="text"/> <input type="text"/> 3 → 12 → 8	<input type="text"/> <input type="text"/> 1 → 10 → 6	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 5
5	<input type="text"/> <input type="text"/> 7 → 1 → 12	<input type="text"/> <input type="text"/> 10 → 4 → 15	<input type="text"/> <input type="text"/> 8 → 2 → 13	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 12
6	<input type="text"/> <input type="text"/> 4 → 12 → 7	<input type="text"/> <input type="text"/> 3 → 9 → 4	<input type="text"/> <input type="text"/> 6 → 18 → 13	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 5
7	<input type="text"/> <input type="text"/> 8 → 4 → 12	<input type="text"/> <input type="text"/> 5 → 1 → 3	<input type="text"/> <input type="text"/> 7 → 3 → 9	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 6
8	<input type="text"/> <input type="text"/> 3 → 9 → 18	<input type="text"/> <input type="text"/> 4 → 12 → 24	<input type="text"/> <input type="text"/> 5 → 15 → 30	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 1
9	<input type="text"/> <input type="text"/> 3 → 5 → 15	<input type="text"/> <input type="text"/> 4 → 6 → 18	<input type="text"/> <input type="text"/> 5 → 7 → 21	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 2
10	<input type="text"/> <input type="text"/> 13 → 4 → 8	<input type="text"/> <input type="text"/> 15 → 6 → 12	<input type="text"/> <input type="text"/> 10 → 1 → 2	<input type="text"/> <input type="text"/> <input type="text"/> → <input type="text"/> → 11

What's the rule?

In each question, there is a set of boxes. Every box follows the same rule. Find the rule, write it down and then use it to work out which numbers are missing from the last box.

The rule for question 1 is 'Multiply the first number by 3, then subtract 4', written $\times 3, - 4$.

	RULE			
1	$\times 3$ $- 4$ 4 12 8	$\times 3$ $- 4$ 7 21 17	$\times 3$ $- 4$ 3 9 5	<input type="text"/> <input type="text"/> 8 24 <input type="text"/>
2	<input type="text"/> <input type="text"/> 5 25 27	<input type="text"/> <input type="text"/> 9 45 47	<input type="text"/> <input type="text"/> 7 35 37	<input type="text"/> <input type="text"/> 4 20
3	<input type="text"/> <input type="text"/> 7 2 6	<input type="text"/> <input type="text"/> 9 4 12	<input type="text"/> <input type="text"/> 8 8 9	<input type="text"/> <input type="text"/> 6
4	<input type="text"/> <input type="text"/> 4 6 30	<input type="text"/> <input type="text"/> 5 7 35	<input type="text"/> <input type="text"/> 2 4 20	<input type="text"/> <input type="text"/> 6
5	<input type="text"/> <input type="text"/> 3 6 60	<input type="text"/> <input type="text"/> 5 8 80	<input type="text"/> <input type="text"/> 1 4 40	<input type="text"/> <input type="text"/> 7
6	<input type="text"/> <input type="text"/> 2 20 13	<input type="text"/> <input type="text"/> 5 50 43	<input type="text"/> <input type="text"/> 3 30 23	<input type="text"/> <input type="text"/> 6
7	<input type="text"/> <input type="text"/> 5 15 30	<input type="text"/> <input type="text"/> 6 18 36	<input type="text"/> <input type="text"/> 9 27 54	<input type="text"/> <input type="text"/> 4
8	<input type="text"/> <input type="text"/> 6 30 19	<input type="text"/> <input type="text"/> 9 45 34	<input type="text"/> <input type="text"/> 3 15 4	<input type="text"/> <input type="text"/> 4
9	<input type="text"/> <input type="text"/> 3 6 30	<input type="text"/> <input type="text"/> 6 12 60	<input type="text"/> <input type="text"/> 2 4 20	<input type="text"/> <input type="text"/> 4
10	<input type="text"/> <input type="text"/> 18 9 27	<input type="text"/> <input type="text"/> 15 6 18	<input type="text"/> <input type="text"/> 11 2 6	<input type="text"/> <input type="text"/> 12

Which two numbers?

1, 2, 3, 4, ... are counting numbers.

Question: Which two counting numbers can be added to give a sum of 8?

Answer: $1 + 7 = 8$, $2 + 6 = 8$, $3 + 5 = 8$, $4 + 4 = 8$ are all the possible solutions.

There are many solutions to the questions below. Can you list them all?
Remember to work systematically.

1 Which two counting numbers can be added to give the sum of:

a 5? $\underline{\quad 1 \quad} + \underline{\quad 4 \quad} = 5$, $\underline{\hspace{2cm}}$

b 6? $\underline{\hspace{2cm}}$

c 10? $\underline{\hspace{2cm}}$

d 12? $\underline{\hspace{2cm}}$

e 15? $\underline{\hspace{2cm}}$

2 Which two counting numbers can be multiplied together to give a product of:

a 6? $\underline{\hspace{2cm}}$

b 12? $\underline{\hspace{2cm}}$

c 16? $\underline{\hspace{2cm}}$

d 20? $\underline{\hspace{2cm}}$

e 24? $\underline{\hspace{2cm}}$

3 Which two counting numbers have a difference of:

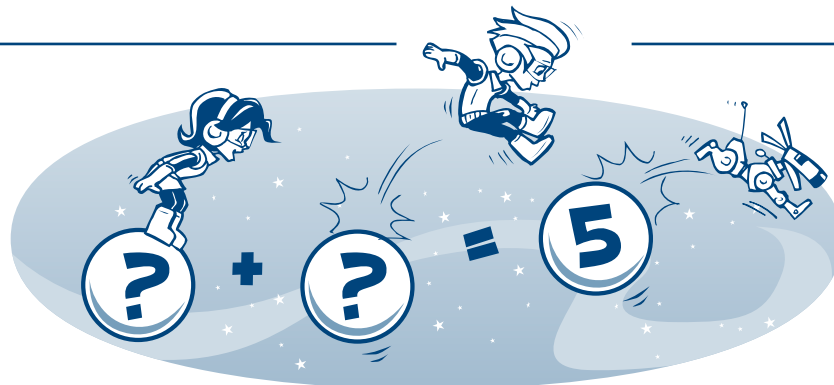
a 3? $\underline{\hspace{2cm}}$

b 5? $\underline{\hspace{2cm}}$

c 6? $\underline{\hspace{2cm}}$

d 10? $\underline{\hspace{2cm}}$

e 17? $\underline{\hspace{2cm}}$



Find two numbers

The product of two numbers is the result you get when you multiply one by the other.
The product of 3 and 4 is 12.

Look at this table.

Numbers whose sum is 10	1, 9	2, 8	3, 7	4, 6	5, 5
The product of these numbers:	9	16	21	24	25



To find the answers to the following questions you may need to draw up a table like this and list all the possibilities.

Find the two numbers I am thinking of if:

- 1** the sum of the numbers is 7 and their product is 10. _____
- 2** the sum of the numbers is 10 and their product is 16. _____
- 3** the sum of the numbers is 10 and their product is 21. _____
- 4** the sum of the numbers is 10 and their product is 9. _____
- 5** the sum of the numbers is 9 and their product is 14. _____
- 6** the sum of the numbers is 9 and their product is 8. _____
- 7** the sum of the numbers is 7 and their difference is 3. _____
- 8** the sum of the numbers is 8 and their difference is 6. _____
- 9** the sum of the numbers is 8 and their difference is 2. _____
- 10** the sum of the numbers is 11 and their difference is 1. _____
- 11** the sum of the numbers is 12 and their difference is 4. _____
- 12** the sum of the numbers is 12 and their difference is 8. _____
- 13** the sum of two numbers is 5, and one is 1 more than the other. _____
- 14** the sum of two numbers is 8, and one is 2 more than the other. _____
- 15** the sum of two numbers is 8, and one is 4 more than the other. _____
- 16** the sum of two numbers is 12, and one is 2 more than the other. _____
- 17** the sum of two numbers is 11, and one is 1 more than the other. _____
- 18** the sum of two numbers is 15, and one is 1 more than the other. _____
- 19** the sum of two numbers is 15, and one is 3 more than the other. _____
- 20** the sum of two numbers is 9, and one is double the other. _____
- 21** the sum of two numbers is 18, and one is double the other. _____
- 22** the sum of two numbers is 30, and one is double the other. _____
- 23** the sum of two numbers is 21, and one is double the other. _____
- 24** the sum of two numbers is 27, and one is double the other. _____