Arithmetic Practice

Contents

Self-descriptive Numbers

The number 4 when written out as FOUR has the particular property that the written word contains the same number of letters as it says.

FOUR has 4 letters

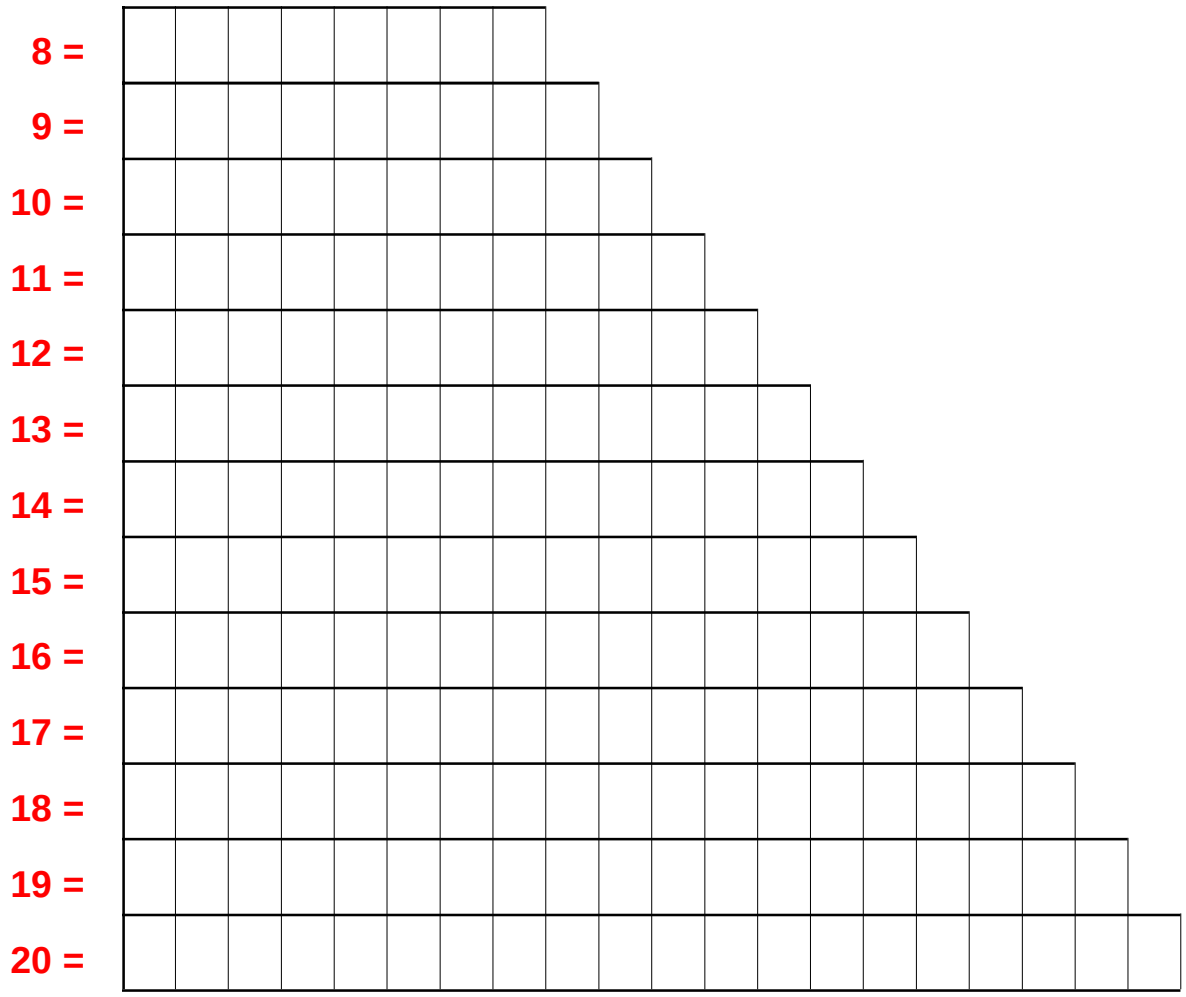
This is the only number in the English language which has this property, and so it can be described as a *self-descriptive number.*

Now take a number like 22 which is written in words as TWENTY TWO and it has only 9 letters so it certainly cannot be described as *self-descriptive*. However, we can write 22 as 17 + 1 + 4 and that in words is

SEVENTEEN ADD ONE ADD FOUR

which does have 22 letters and so, in that form, is *self-descriptive*.

Try to find ways of making all the numbers from 8 to 20 *self-descriptive* in form and fill them in on the grid below. The grid is to help get the letter-count correct, but remember that the sum implied by the words must also work out to make the correct number.
Since it depends only on counting the letters, write the words in the grid without leaving any spaces between them. No signs (like + - × etc.) are allowed, only words, and the whole thing must make perfectly good sense to read.



A. Complete these Magic Squares. In each case only the numbers 1 to 16 may be used and no numbers may be repeated. The Magic Total for each is 34.

1	2	15	
12	14	3	
13	7	10	

2		15	16
11		10	5
7		6	9

3	1		16
8	15		9
10	12		5

4	1	13	
14	15		
7			11
		8	5

7	1	16	10
6			3
12			13

8		11	
	13		2
1		6	
	4		7

B. Complete these Magic Squares. In each case only the numbers 1 to 16 may be used and no numbers may be repeated. The Magic Total for each is 34.

1	2	15	
13	14	3	
12	7	10	

2		16	15
14		9	3
7		5	10

3	1		16
12	15		5
6	8		9

5	1	16	
14	10		
4			9
		2	6

7	1	16	10
14			11
4			5

8		13	
	14		1
2		5	
	6		7

C. Complete these Magic Squares. In each case only the numbers 1 to 16 may be used and no numbers may be repeated. The Magic Total for each is 34.

1	2	16	
13	14	4	
12	7	9	

2		16	15
11		9	6
7		5	10

3	1		16
13	15		4
10	12		5

6	1	16	
3	12		
15			2
		4	7

7	2	15	10
4			5
14			11

8		6	
	16		4
15		3	
	5		7

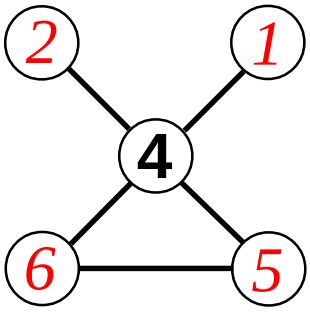
Magic 30

Below are several copies of the same magic square.
The “magic total” of this particular square is 30.
That is, the four numbers along each row, down each column, and along the two diagonals always add up to 30. That gives 10 ways of making 30 with four numbers.
However there are many more ways than that.
Find as many **other** ways of making 30 (always using four numbers) as you can and shade them in, using a separate diagram for each. The first one is done for you.

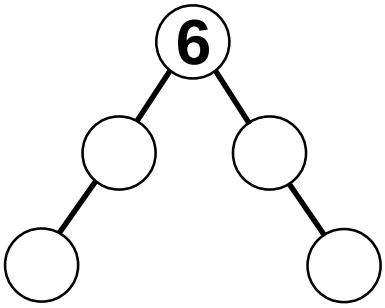
0	7	9	14
13	10	4	3
6	1	15	8
11	12	2	5

Totalines

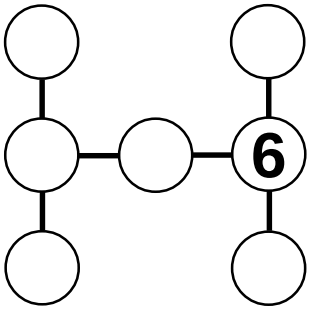
Numbers have to be placed in the empty circles. The numbers to be used are listed under each diagram and no given number may be used twice.
The object is to place the numbers so that all those which lie along a straight line, as shown by the lines drawn, add up to the total which is also given under the diagram.
The first one has been done for you.



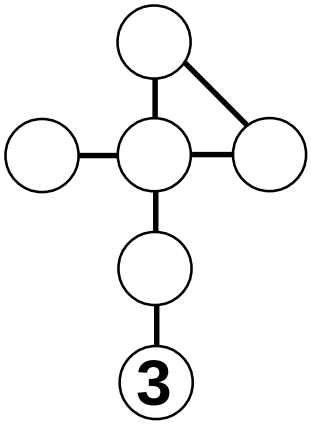
Use 1, 2, 5, 6
Total **11**



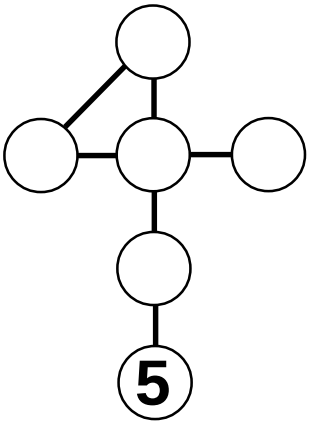
Use 2, 3, 4, 5
Total **13**



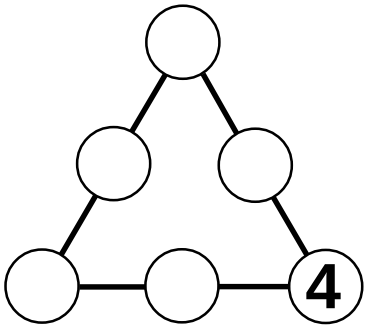
Use 0, 1, 2, 3, 4, 5
Total **10**



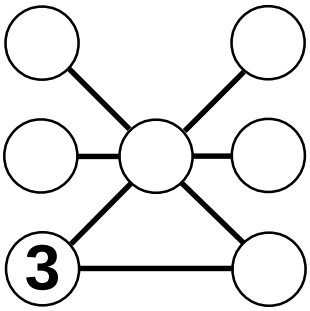
Use 1, 2, 4, 5, 6
Total **11**



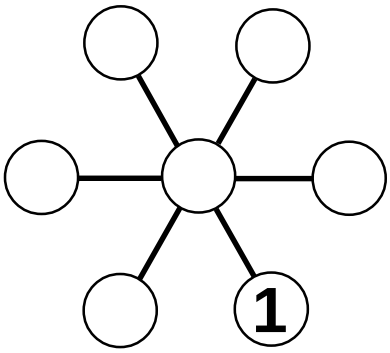
Use 0, 1, 3, 4, 6
Total **10**



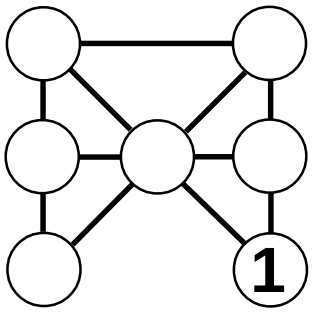
Use 0, 1, 2, 3, 5
Total **9**



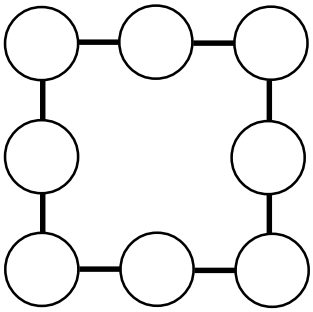
Use 1, 2, 4, 5, 6, 7
Total **10**



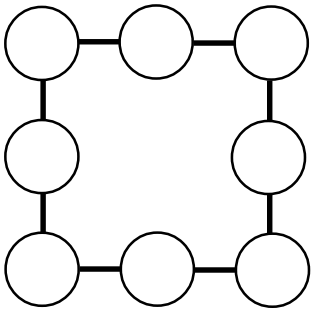
Use 0, 2, 4, 5, 6, 7
Total **11**



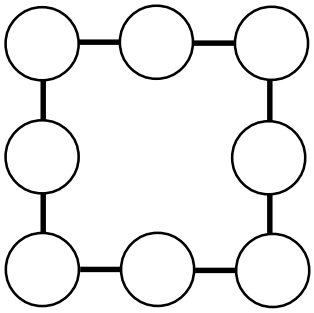
Use 2, 3, 4, 5, 6, 7
Total **12**



Use 2, 2, 2, 3, 3, 3, 5, 5
Total **10**

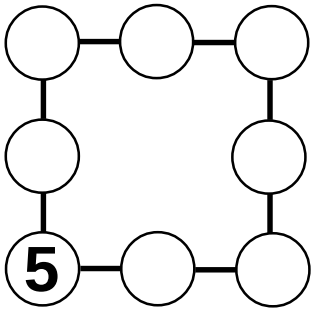


Use 1, 2, 2, 3, 3, 4, 5, 6
Total **10**

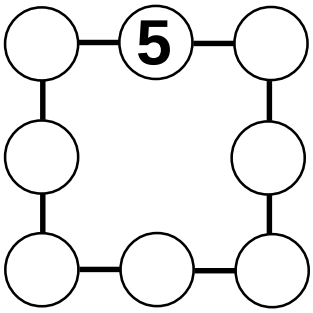


Use 1, 1, 2, 2, 2, 3, 6, 7
Total **10**

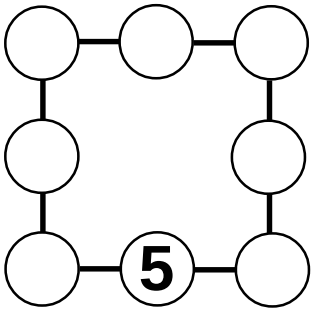
Totalines - continued



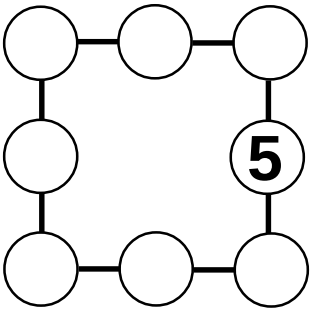
Use 1, 2, 3, 4, 6, 7, 8
Total **13**



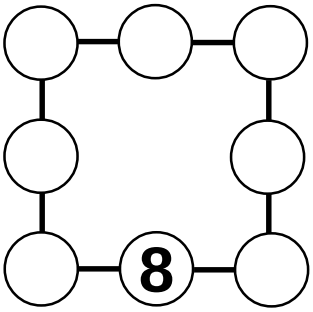
Use 1, 2, 3, 4, 6, 7, 8
Total **14**



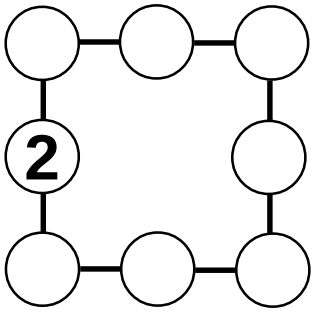
Use 2, 3, 4, 6, 7, 8, 9
Total **15**



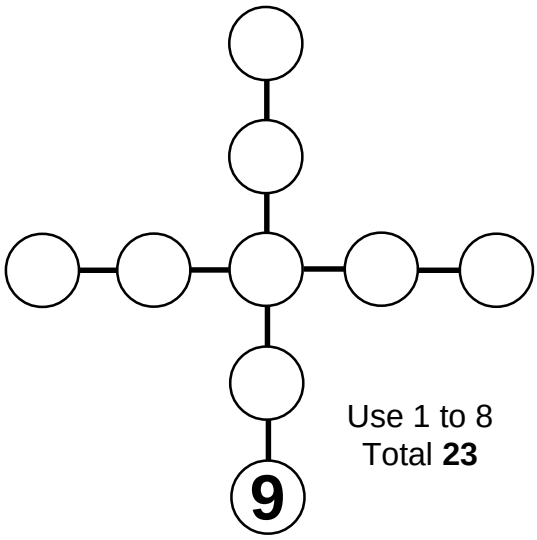
Use 2, 3, 4, 6, 7, 8, 9
Total **16**



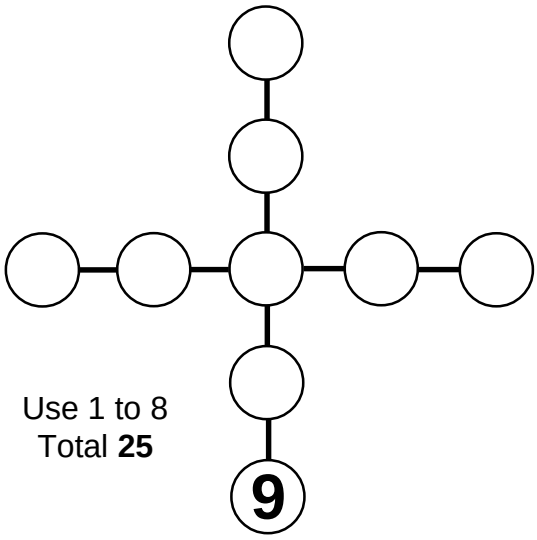
Use 2, 3, 4, 5, 6, 7, 9
Total **17**



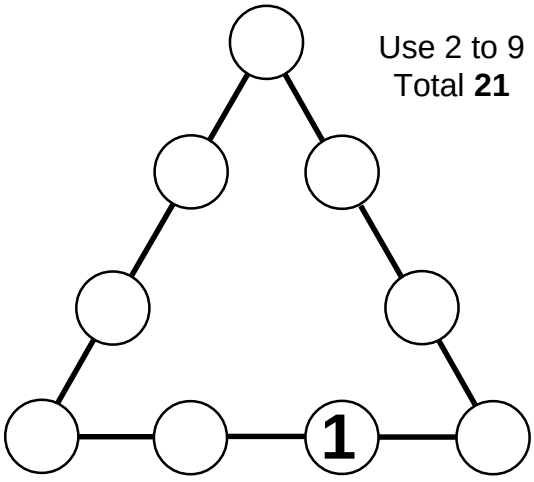
Use 3, 4, 5, 6, 7, 8, 9
Total **18**



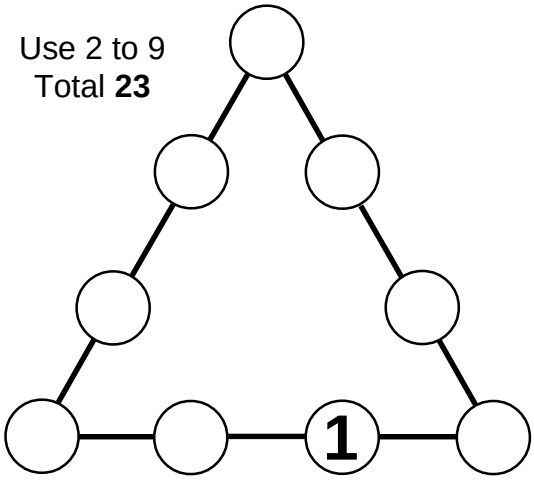
Use 1 to 8
Total **23**



Use 1 to 8
Total **25**



Use 2 to 9
Total **21**



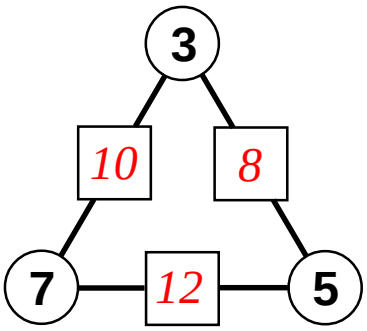
Use 2 to 9
Total **23**

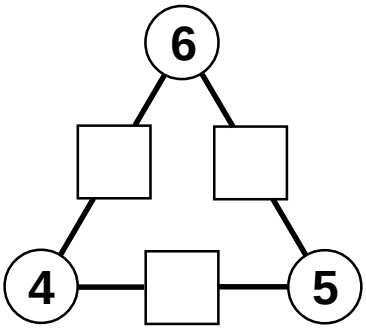
Addogons

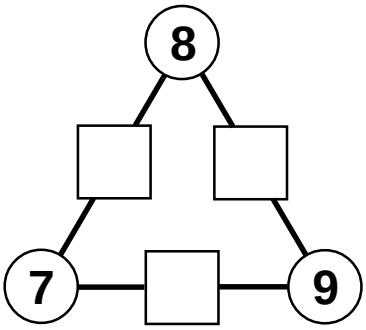
Fill in the missing numbers in the empty squares and circles on each of these diagrams.
There is only one rule -

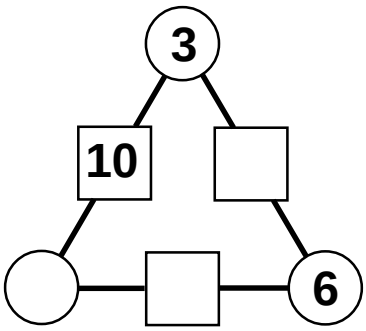
In all of these diagrams, the number in any square is the **sum** of the two numbers in the circles on either side of that square.

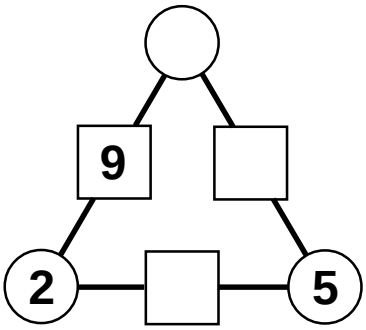
The first one has been done for you.

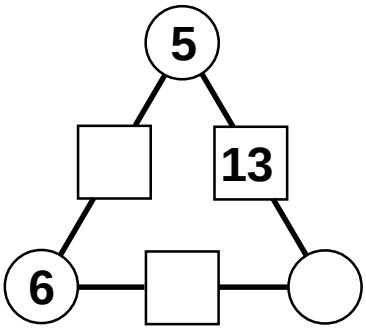


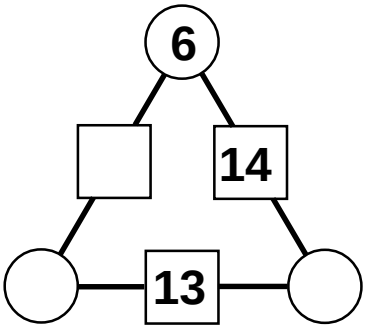


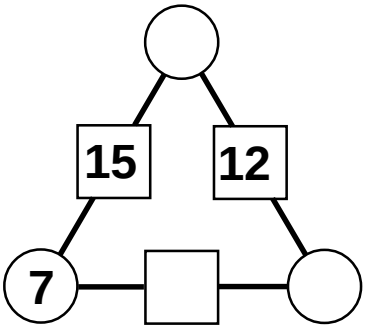


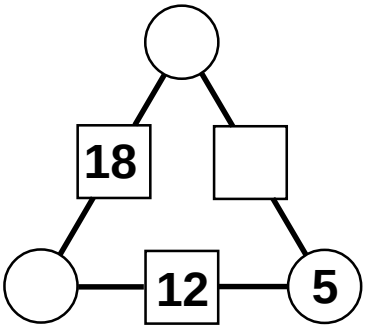


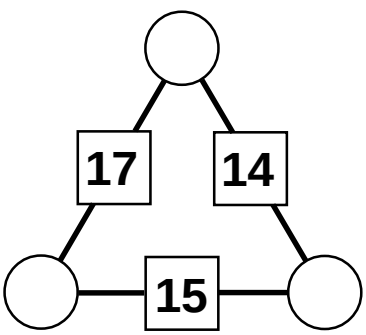


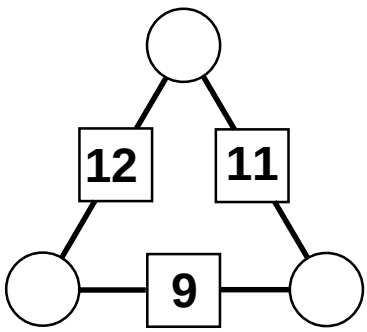


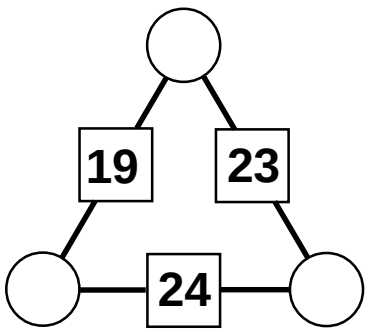




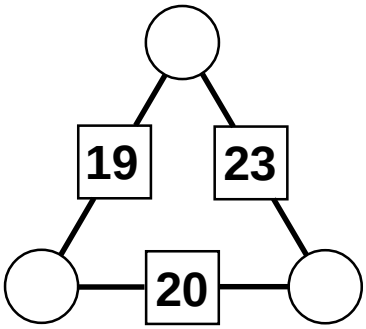


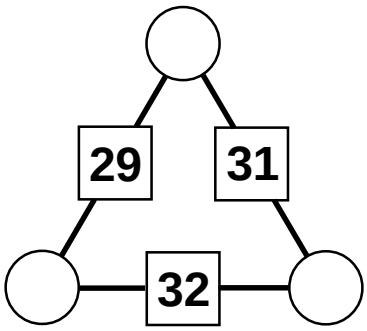


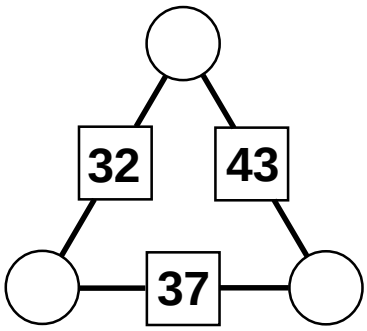


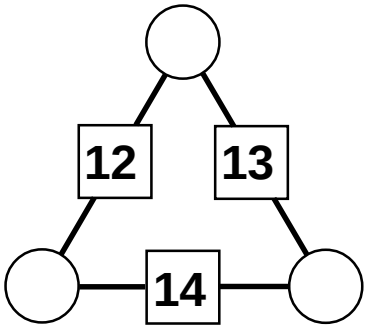


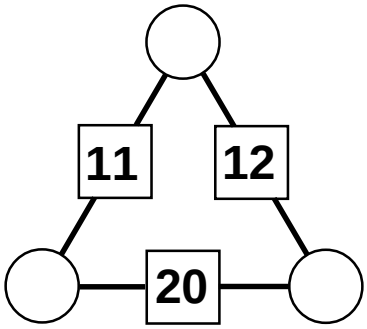
Addogons - continued

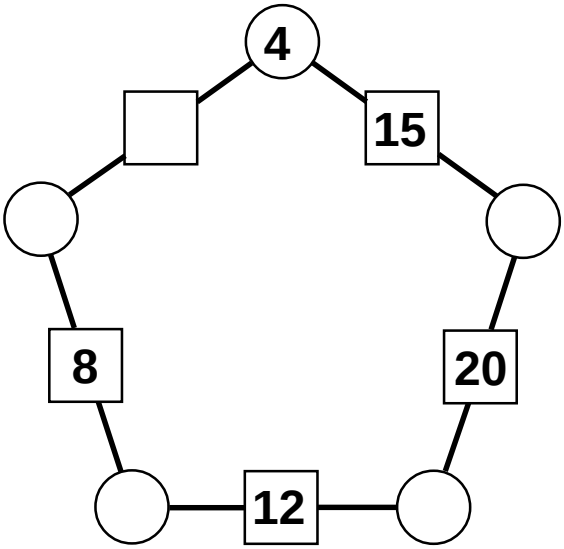


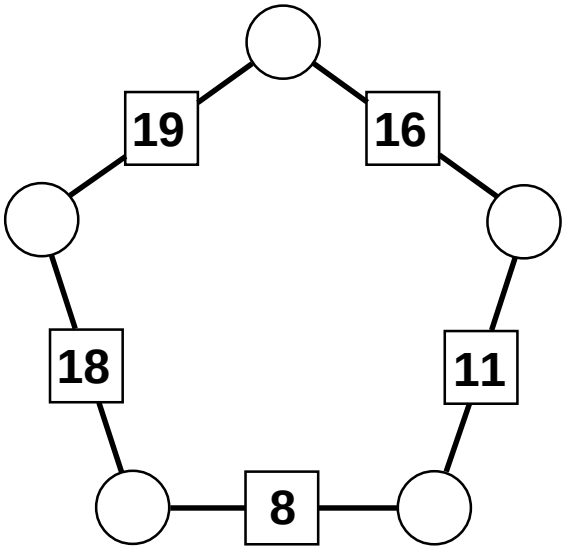


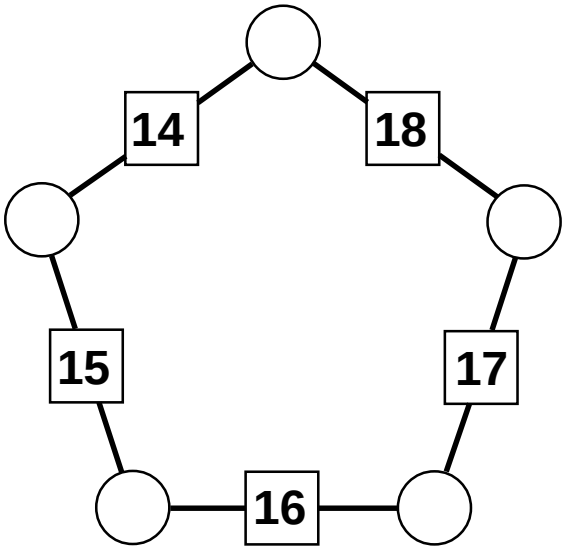


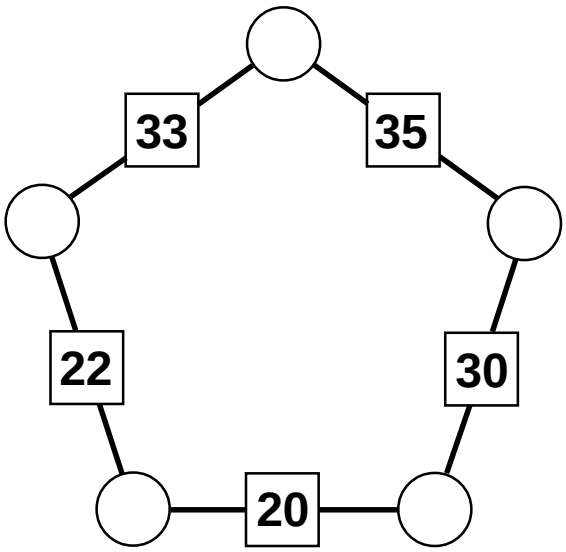










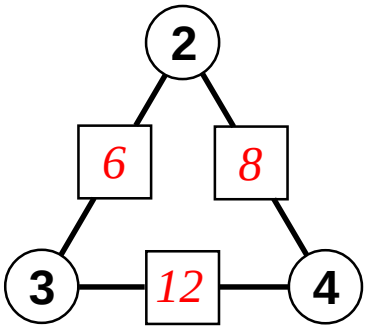


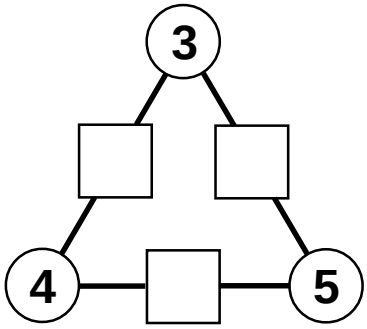
Multogons

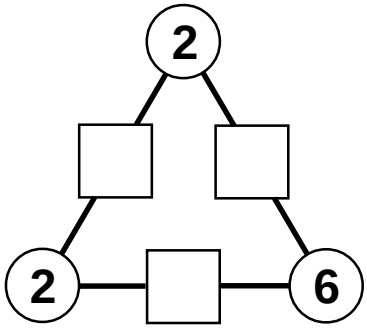
Fill in the missing numbers in the empty squares and circles on each of these diagrams.
There is only one rule -

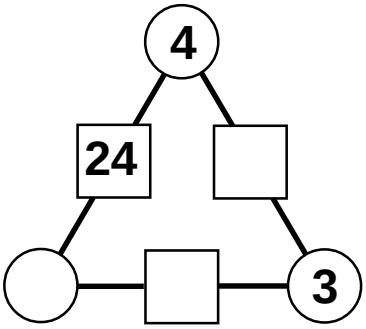
In all of these diagrams, the number in any square is the **product** of the two numbers in the circles on either side of that square.

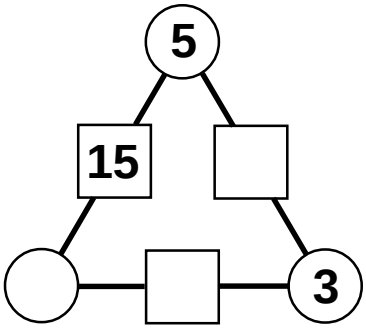
The first one has been done for you.

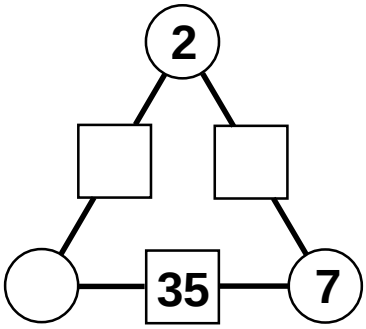


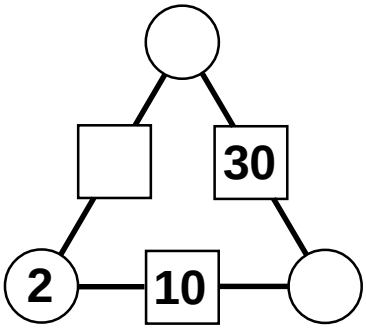


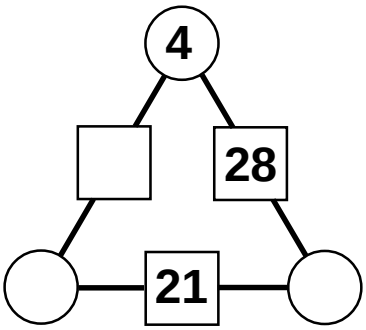


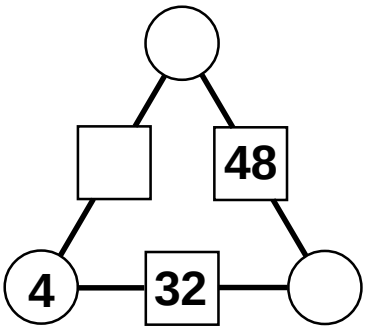


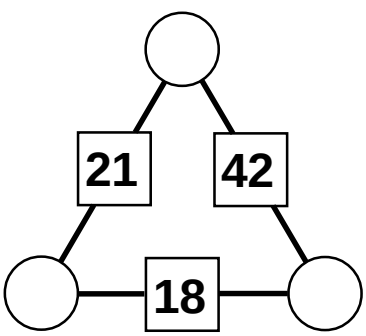


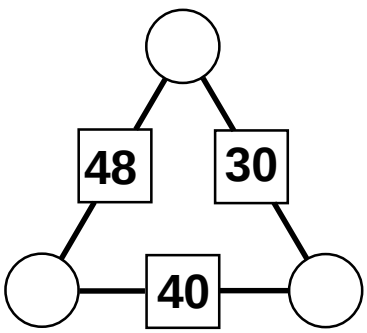


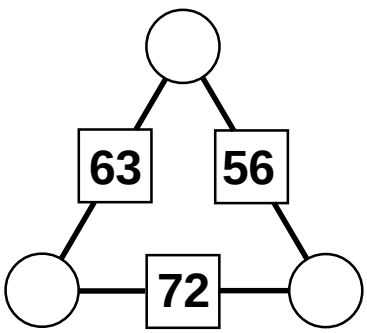




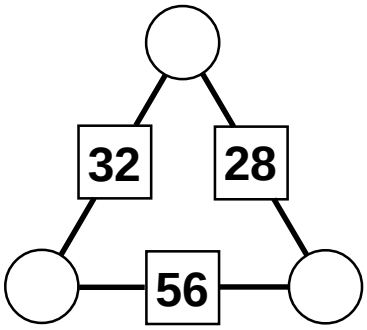


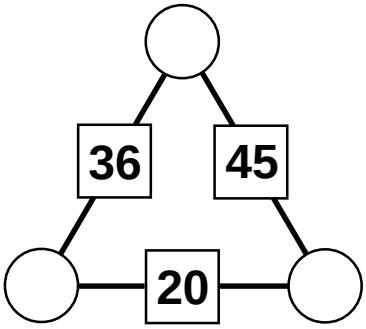


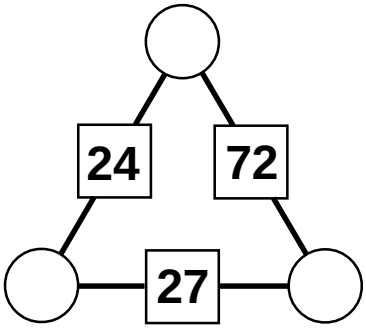


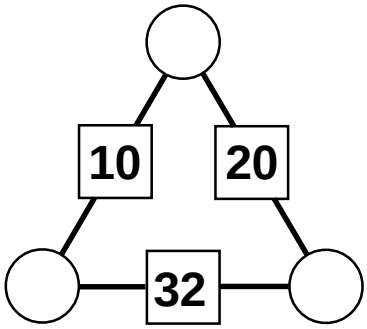


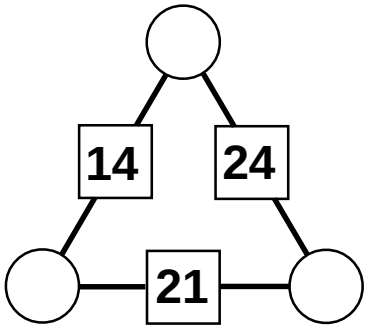
Multogons - continued

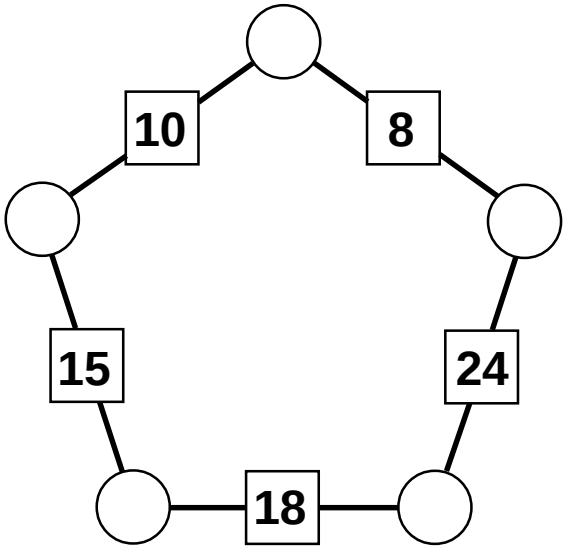


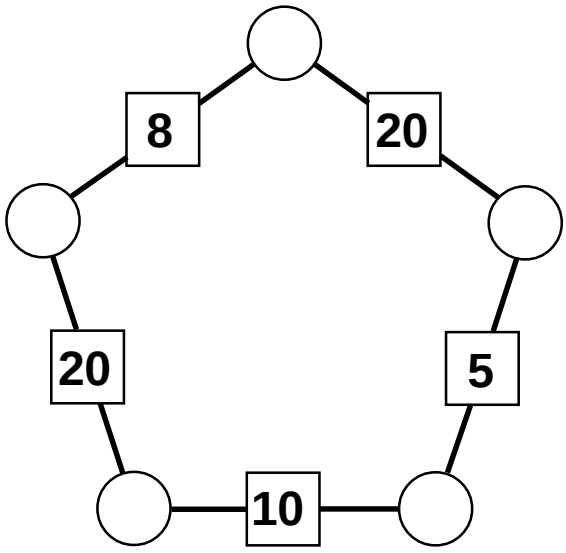


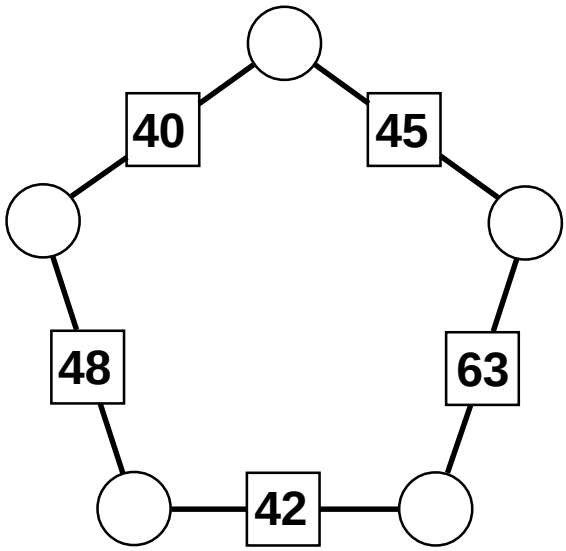


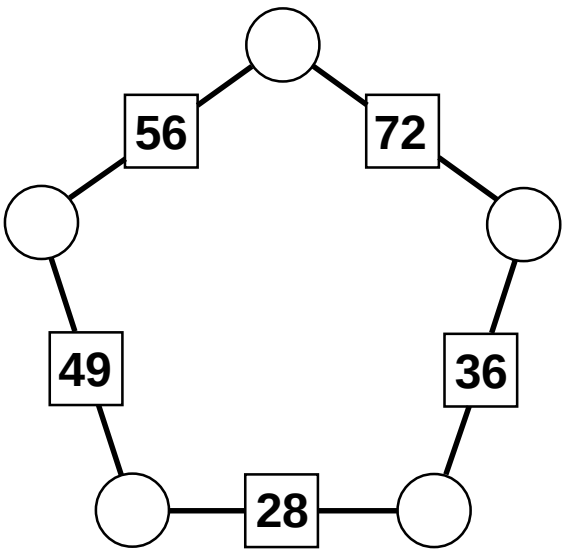












Arithmecuts

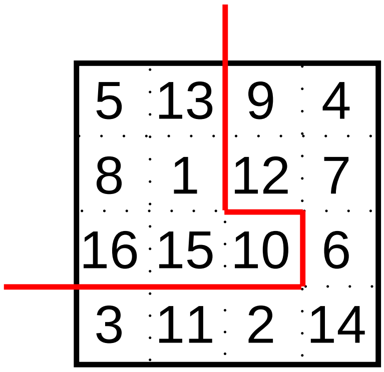
The numbers 1 to 16 have been randomly arranged on a 4 by 4 grid. Several copies of the same grid are drawn below.

You have to find a way of dividing the grid into 2 parts, which do **not have to be** of the same shape or size, so that the total of the numbers in one part is equal to the total of the numbers in the other part.

The dividing line between the 2 parts must be continuous and must follow along the dotted lines dividing the cells.

One way of doing it has been shown as an example.

Find, and draw, as many other ways of doing it as you can.



5	13	9	4
8	1	12	7
16	15	10	6
3	11	2	14

5	13	9	4
8	1	12	7
16	15	10	6
3	11	2	14

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8	1	12	7
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5	13	9	4
8	1	12	7
16	15	10	6
3	11	2	14

Jumblies

Section A

In this section each of the statements has had its order of words jumbled up.
Rewrite each one so that it makes sense.

For example PLUS EIGHT IS TEN TWO
should be EIGHT PLUS TWO IS TEN

1. FIVE EQUALS PLUS FOUR NINE
2. FIFTEEN AND NINE MAKES SIX
3. TAKE THREE SEVEN TEN EQUALS
4. NINE FROM IS ELEVEN TWO
5. TWELVE TIMES THREE IS FOUR
6. SHARED THREE BY FIFTEEN FIVE EQUALS
7. TIMES TWO GOES NINE EIGHTEEN INTO
8. FIFTEEN MAKES NINE TO ADDED SIX
9. ADD ONE IS FOUR SIX EQUAL ADD THREE TO
10. TO TWO NINE EQUAL ADD FIVE IS TIMES SEVEN

Section B

In this section each of the statements has its words in correct order, but the letters of each word have been jumbled up.
Rewrite each one with the words spelt correctly.

For example ROUF DAD REETH SQUEAL NEEVS
should be FOUR ADD THREE EQUALS SEVEN

11. WOT SLUP THERE SKAME VIEF
12. EVENS DAD ENIN SLAQUE ENTEXIS
13. TIGHE KATE IXS SI WOT
14. VIEF FORM VETLEW IS VENES
15. WOT MITES THERE SQUEAL IXS
16. HERET MISTE OURF SKAME WELVET
17. ENTEROUF SUNIM NEVLEE SI REETH
18. GETHI MISET TOW LAQUES TEESNIX
19. HEEETING HARDES BY XIS SI HERET
20. NET TOIN ROFTY SOGE ORUF SMITE

Section C

In this section each of the statements has had its words jumbled as well as the letters of each word.
Rewrite each one with the words spelt correctly and in their correct order.

For example SLUP INTEEFF XIS INEN SLAQUE
spelt correctly PLUS FIFTEEN SIX NINE EQUALS
should be SIX PLUS NINE EQUALS FIFTEEN

21. SPUL FORU NELEEV SI VENES
22. DAD GHEIT SI ROUFEENT
23. MASKE VIFE ENTRITHE THIGE SINUM
24. HETER VELEWT IS TEAK INNE
25. WOT QUALES EMITS TREEFOUN VENES
26. GOTHUN KATE SNEEV VEGIS EVENS
27. WOT NET IS RASHED BY WETTYN
28. OWT MORF SMEAK BACTRUST TENIENEN NEEETEVNS
29. NIFFTEE PLUMDILITE YB EERTH SAKEM FEVI
30. BY DIDDEVI WOT GETHI IS ORFU

Vocabulary

ONE
TWO
THREE
FOUR
FIVE
SIX
SEVEN
EIGHT
NINE
TEN

ELEVEN
TWELVE
THIRTEEN
FOURTEEN
FIFTEEN
SIXTEEN
SEVENTEEN
EIGHTEEN
NINETEEN
TWENTY

THIRTY
FORTY
FIFTY
SIXTY
SEVENTY
EIGHTY
NINETY
HUNDRED

ADD
PLUS
TAKE
MINUS
SUBTRACT
MULTIPLIED
TIMES
SHARED
DIVIDED
EQUALS
MAKES