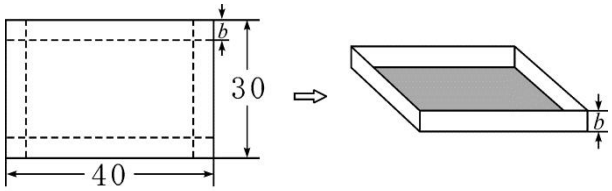
2019 WMTC

儿童组个人赛第一轮

Junior Level Individual Round 1

1．If $2^{2019}+2019$ divided by 7，then the remainder is_____.

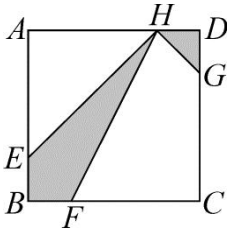
2．As shown in the figure. If **A** is a rectangle and its area is 40×30. Remove a square with side *b* from its four corners, respectively, make a box without lid **B** and its volume is 2816. Then *b*=_____.



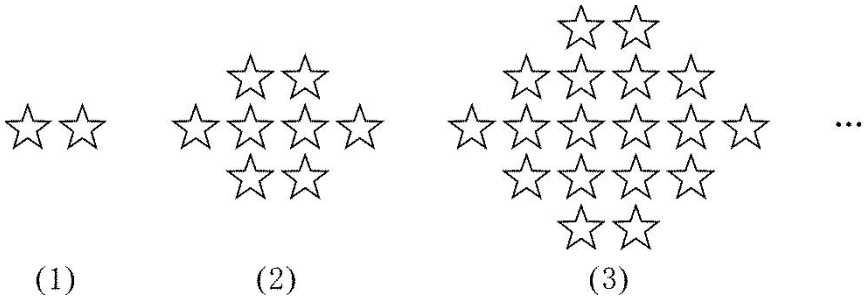
A B

3．Symbol & represents an operation, if $x\,\&\,y=\dfrac{x+5m}{xy-3y}$，4&7=2，then *m*=_____.

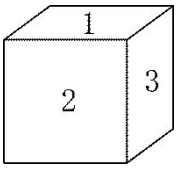
4．The area of square *ABCD* is 16，if $BE=BF=DG=DH=\dfrac{1}{4}AB$，then the area of the shadow is_____.



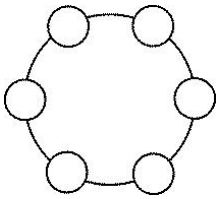
5．Figure (1) has 2☆, figure (2) has 8☆, figure (3) has 18☆, …, then figure (11) has_____☆.



6．There is numbers 1, 2, 3, 4, 5, 6 on each of the six surfaces of a cube, if you throw at twice at will and use S to represent the sum of the numbers of the upward faces, then the probability of S =8 is_____.



7．Write 3,4,5,6,7,8 on a circle freely, then calculate the product of two adjacent numbers, and then work out the sum S of these products, then the minimum value of S is_____.



8．A is a decimal, exchange the numbers of A before and after decimal point to get B（eg. A=12.34,then B=34.12）, and B=3A+6, B<100, then A=_____.

2019 WMTC

儿童组个人赛第二轮

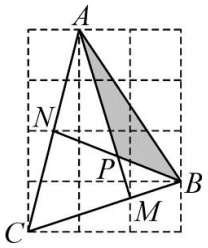
Junior Level Individual Round 2

9．If a, b, c, d, e, f are natural numbers, and

$$a^2+b^2+c^2+d^2+e^2+f^2=154,\ 0<a<b<c<d<e<f,$$

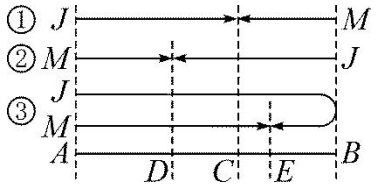
then $\dfrac{b+c+d}{a+e+f}$=_____.

10．The following figure is a network graph, A, B, C are all lattice points, AM and BN intersect at point P. If $S_{\triangle ABP}$ =12 ， then $S_{\triangle ABC}$=_____.



11．Suppose $\overline{ab}$ and $\overline{cd}$ are two digit numbers, $\overline{ab}-\overline{cd}=1$ and $d=(a+b+c)^2$，then $\overline{abcd}$=_____.

12．Automobile J and M driving between A and B, in the case of ①、②、③, start at the same time and drive at a uniform speed, if DC ＝100， CE＝50， then the ratio of velocity of J to M is_____.



2019 WMTC

儿童组个人赛第三轮

Junior Level Individual Round 3

13．If a and b are natural numbers, $a+b=18$, and $a\div b$ is recurring decimal，and the sum of the digits in each cyclic section is 9,then a=_____.

14． Ship M travels 20 kilometers per hour in still water, it from A upstream to downstream B, and then immediately returns to A, it takes 32 hours and the voyage is 600 kilometers. Ship N travels 5 kilometers more than M per hour. It also travels from A to B and back to A. Then ship N took _____ hours.

2019 WMTC

儿童组接力赛第一轮

Junior Level Relay Round 1

1-A

Known n and $\frac{9n}{n-15}$ are natural numbers, then how many values of n? Answer: _____.

2019 WMTC

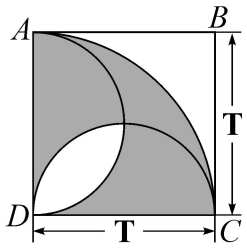
儿童组接力赛第一轮

Junior Level Relay Round 1

1-B

Let **T** be the number you will receive.

If *ABCD* is a square, and *AB*=**T**, then the area of the shadow is_____.（π=3）



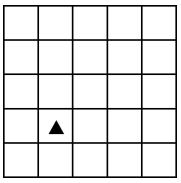
2019 WMTC

儿童组接力赛第二轮

Junior Level Relay Round 2

2-A

As shown in the figure. It is a grid of 5×5, how many squares contain ▲? Answer: _____.



2019 WMTC

儿童组接力赛第二轮

Junior Level Relay Round 2

2-B

Let **T** be the number you will receive.

Write the square numbers 1,4,9,16,25,36,49,…, continuously, and we get *M*=1491625…,then the (**T**+100)th digit from left to right in *M* is _____.

2019 WMTC

儿童组接力赛第三轮

Junior Level Relay Round 3

3-A

If seven digits number $\overline{27ab356}$ can be divided by 198, then $\overline{ab}$ =_____.

2019 WMTC

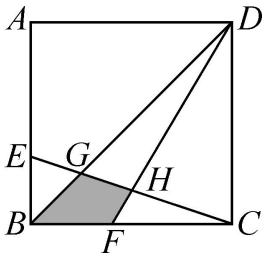
儿童组接力赛第三轮

Junior Level Relay Round 3

3-B

Let **T** be the number you will receive.

If *ABCD* is a square, and $BE=\frac{1}{3}AB$, $BF=\frac{2}{5}BC$, the area of square *ABCD* is **T**. Then the area of *BGHF* is_____.



2019 WMTC

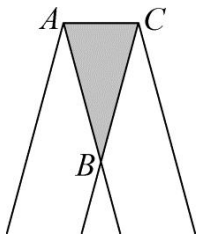
儿童组团体赛

Junior Level Team Round

1．The table is Magic square of order four. There are four numbers in each row, or each column, or each diagonal line. Their respective sum is the same, then $a \times b$=_____.

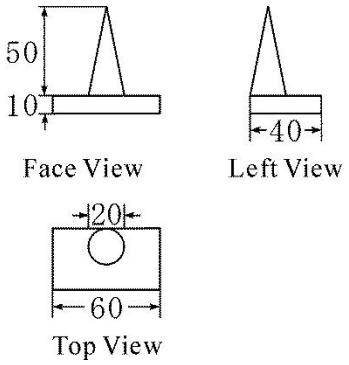
1	$2a$	$2a$	4
$6+b$	a	6	9
8	$2b$	$2b$	b
13	2	3	$3b$

2．As shown in the figure. Fold a 2cm strip of paper along AC, if $\angle ABC=30°$， then the area of the shadow is_____cm^2.



3．In the natural number of four digits, there are n numbers, they divided by 9 and the remainder is 8, then n=_____.

4．This is a three-dimensional view of the geometry as shown. Then its volume is_____.（π=3）

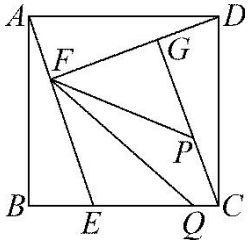


5． Extract *n* numbers from odd numbers 1, 3, 5,⋯,2021, these *n* numbers must satisfy the conditions: for any two *A* and *B* of them, *A* is not an integer multiple of *B*, then the maximum value of *n* is_____.

6. There are 2019 balls in 63 boxes, the number of these boxes are 1, 2, 3, ⋯, 63. The number of balls in these boxes is different from each other, the number of balls in each boxes is not less than the number of the box. How many different ways of putting the ball? Answer:_____.

7．Let $\overline{ab}(b \neq 0)$ be 2-digit number. If $\frac{\overline{a_1 b_1}}{a_1 + b_1} = \cdots = \frac{\overline{a_n b_n}}{a_n + b_n} = m(n > 1)$, and *m* is a natural number, then the maximum value of *n* is_____.

8． The square *ABCD* is partitioned into six equal area parts, and *QC*=1, then the area of *ABCD* is_____.



9．With 4 *A*, 3 *B* and 1 *C*, one *M* can be made. Each worker can make 10 *A*, or 5 *B*, or 4 *C* per day. Now let 50 workers work for one day. In order to get the most *M*, how many workers need to produce *A*? Answer:_____.

10．If $\overline{abcd}$ is four digits number, and $2000 < \overline{abcd} < 3000$， and $a+b+c+d=12$. Then the number of $\overline{abcd}$ is_____.

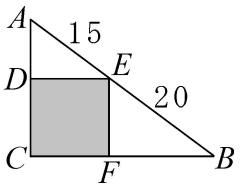
11．Look at the following six equations：

3=（2+1）×（2-1），5=（3+2）×（3-2），7=（4+3）×（4-3），

8=（3+1）×（3-1），12=（4+2）×（4-2），15=（4+1）×（4-1），

Here 3, 5, 7, 8, 12, and 15 are called Hope number. Then how many Hope numbers are there in 100~2020? Answer:_____.

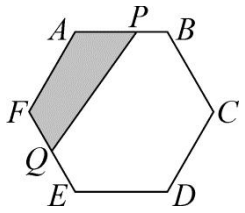
12．In △*ABC*， *CDEF* is a square， *AE*=15，*EB*=20. Then the area of square *CDEF* is_____.



13．Cinna’s birthday is *M* month *N* day, and 31*M*+12*N*=524. Then *M*+*N*=_____.

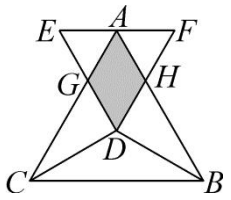
14．If three digit numbers $\overline{abc}, \overline{acb}, \overline{cba}$ are prime numbers, and *a*, *b*, *c* are distinct numbers, then $\overline{abc}$=_____.

15．If the area of the regular hexagon *ABCDEF* is 60, *AP* = 2*BP*, *FQ* = *EQ*, then the area of the shadow part is_____.



16．If *a*, *b*, *c* are natural numbers, then how many values for (*a*, *b*, *c*) so that $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=\frac{3}{5}$? Answer:_____.

17．△*ABC* and △*EFD* are equilateral triangles, *AHDG* is a diamond. If $S_{\triangle CDG}=S_{AHDG}$=12, then the area of △*ABC* is_____.



18．Known *a*, *b*, *c*, *d*, *e* are continuous natural numbers, and $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}+\frac{1}{d}+\frac{1}{e}=\frac{153}{140}$, then $a+b+c+d+e$=_____.

19．Known *A*-*B*=1.981. If you remove the decimal point, then "*A*-*B*＝4087(*A*, *B* are natural numbers) ". The value of *A* is_____.

20．Known $\overline{abc}$ is a 3-digit number ,and the last three digits of $\left(\overline{abc}\right)^2$ is $\overline{abc}$， then the sum of these 3-digit numbers is _____.

2019WMTC Junior Level

Individual Rounds

1	2	3	4	5	6	7
4	4	2	4	242	$\frac{5}{36}$	166
8	**9**	**10**	**11**	**12**	**13**	**14**
22.74	$\frac{3}{4}$	48	2019	5:3	7	25

Relay Rounds

1-B	2-B	3-B
40	1	5.7

Team Round

1	2	3	4	5	6	7	8	9	10
35	4	1000	29000	674	7	4	36	16	63
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
1441	144	31	179	15	49	54	25	4.321	1001