2020 **P**Eye Level MATH Olympiad [Grade1]

No.	Answer								
1	25	11	27	21	142	31	19	41	4
2	20	12	22	22	721	32	59	42	29
3	8	13	5	23	1,012	33	19	43	2
4	6	14	7	24	26	34	19	44	17
5	6	15	22	25	698	35	15	45	2
6	5	16	3	26	577	36	4	46	3
7	15	17	8	27	162	37	18	47	3
8	19	18	18	28	632	38	365	48	6
9	23	19	26	29	2,548	39	118	49	14
10	18	20	118	30	8,091	40	48	50	7

(Sol)

44. The answer is 17.



46. Possible lengths that can be made with the given blocks are as follows:



So 7 of the option ③ is not a possible length to come up with using the blocks given.

48. Following the pattern along the number of circles, six circles need to be put in the column.

••	::	••	::	::	••	::	::	::
2	4	2	4	6	2	4	6	8

49. The answer is 14.

50. The answer is 7.



2020 **P**Eye Level MATH Olympiad [Grade2]

No.	Answer								
1	127	11	6	21	576	31	61	41	2
2	133	12	18	22	608	32	242	42	67
3	467	13	54	23	873	33	9	43	3
4	398	14	49	24	1,458	34	86	44	3
5	901	15	126	25	1,566	35	65	45	2
6	1,300	16	215	26	32,674	36	100	46	(4)
7	36	17	396	27	7R4	37	600	47	14
8	18	18	87	28	8R6	38	21	48	9
9	36	19	2,573	29	8R31	39	22	49	12
10	19	20	225	30	25R16	40	9	50	15

(Sol)

41. The following 2 figures cannot be made:



- **42.** A=20, B=47
- **43.** Below are the figures in order from the most bottom.



48. The answer is 9.



49. The figure on the right looks as below.





The number of the patterns is 12.

50. 10, 20, 21, 30, 31, 32, 40, 41, 42, 43, 50, 51, 52, 53, 54

2020 **P** Eye Level MATH Olympiad [Grade3]

No.	Answer								
1	9	11	31	21	32	31	232	41	3
2	11	12	21	22	49	32	864	42	(2)
3	18	13	15	23	51	33	12	43	12
4	27	14	14	24	20	34	3	44	(1)
5	18	15	22	25	28	35	23	45	13
6	21	16	13	26	3	36	17	46	16
7	11	17	50	27	4	37	8	47	10
8	13	18	228	28	4	38	15	48	(4)
9	16	19	129	29	44	39	4	49	7
10	15	20	728	30	26	40	9	50	14

[Sol]

41. The answer is 3.



43. In order to fully fill C, we need four times of the full amount of water in B which each requires three times of the full amount of water in A.

So the answer is $3 \times 4 = 12$ (times).

44. The total shaded area in the example is 14.
Each figure is shaded as follows:
1 14 (2) 16 (3) 13 (4) 13

45. ● : 1, **—** : 5

- 46. The relationship between A, B, and C is 2A+B=C.So the missing number is 16.
- 47. Cubes on the bottom level: 6 Cubes on the 2nd level: 3 Cubes on the 3rd level: 1 So there are 10 cubes total.

48. When a mirror is placed

 at ①: 1 1 0 1 1

 at ②: 1 1 0 1 0 1 0 1 0 1 1

 at ③: 1 1 0 1 0 1 0 1 1 1

 at ④: 1 1 0 1 0 1 0 0 1 1 1

- **49.** Step 1: 3-1=2
 - Step 2: (1+5)-3=3 Step 3: (3+7)-(1+5)=4 Step 4: (1+5+9)-(3+7)=5 Step 5: (3+7+11)-(1+5+9)=6 Step 6: (1+5+9+13)-(3+7+11)=7
- **50.** 2×4=8×1, 4×4=8×2, 2×A=8×3, B×16=8×4 A=12, B=2 ∴ 12+2=14

2020 **R** Eye Level MATH Olympiad [Grade4]

No.	Answer								
1	17	11	31	21	14	31	832	41	3
2	28	12	36	22	13	32	22	42	1)
3	17	13	38	23	37	33	26	43	(4)
4	17	14	60	24	2	34	73	44	15
5	15	15	63	25	4	35	6	45	2
6	31	16	272	26	1	36	95	46	319
7	78	17	151	27	222	37	125	47	34
8	119	18	120	28	691	38	10	48	1
9	173	19	767	29	5	39	4	49	15
10	516	20	21	30	13	40	80	50	10

(Sol)

41. The answer is 3.



44. The following shows the complete set of Saturdays of this month.

Sun	Mon	Tue	Wed	Thur	Fri	Sat
						1
2	3	4	5	6	7	8
						15
						22
						29

Among 1, 8, 15, 22, and 29, the number that has a reminder of 0 when divided by 5 is 15.

45. The rule is C=3A-B.

2×3-3=3 (Yes) 4×3-1=11 (No) 7×3-8=13 (No) 8×3-6=18 (Yes) The answer is 2.

46. The greatest is 421 and the smallest is 102, so the difference is 319.

- 47. Painted faces on the 1st level: 5+3+3+3+5=19 Painted faces on the 2nd level: 4+2+4=10 Painted faces on the 3rd level: 5 Therefore, the total is 34
- **48.** When you attempt to multiply 7 by itself multiple times, the digits in the ones place are as below:

Number of times multiplied	1	2	3	4	5	•••
Number in the one place	7	9	3	1	7	•••

As shown above, the numbers 7, 9, 3, and 1 are being repeated in the ones place. 40 is one of the multiples of 4, so 1 would be in the ones place of the product you will get when you multiply 7 by itself 40 times.

50. 11, 22, 101, 121, 202, 212, 1221, 2112, 12021, 21012

2020 **R** Eye Level MATH Olympiad [Grade5]

No.	Answer								
1	16	11	62	21	14	31	27	41	2
2	15	12	25	22	4	32	9	42	3
3	29	13	86	23	1	33	9	43	5
4	49	14	729	24	4	34	6	44	51
5	37	15	245	25	13	35	25	45	(4)
6	123	16	377	26	1	36	10	46	13
7	7	17	80	27	7	37	5	47	12
8	24	18	68	28	64	38	77	48	121
9	39	19	61	29	76	39	48	49	28
10	31	20	7	30	15	40	4	50	10

(Sol)

43. The two numbers ○ and ☆ of which the sum is 11 and the product is 24 are 8 and 3. The difference between the two is 5.

44.
$$A \longrightarrow B$$
 : $A \div 4 = B$
 $B \longrightarrow C$: $B + 3 = C$
Therefore, $A=24$, $B=8$, $C=19$

46.	Sun	Mon	Tue	Wed	Thur	Fri	Sat
						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
		``````````````````````````````````````			·		

$$(\Box - 7) + (\Box + 7) + (\Box + 1) + (\Box - 1)$$
$$= 4 \times \Box = 52$$
$$\therefore \Box = 13$$

**48.** 1+3+9+27+81=121



$$\begin{split} B + C + D &= (22 + 13 + 21) \div 2 = 28 \\ B &= 28 - 21 = 7, \quad C = 28 - 22 = 6, \\ D &= 28 - 13 = 15, \quad A = 20 - 7 = 13, \\ N &= 13 + 15 = 28 \end{split}$$





The numbers left after deleting the numbers 1, 3, 5, 7, 9, 11, 13 are 2, 4, 6, 8, 10, 12.

The 2 next to the erased number 13 is skipped and when 4, 8, and 12 are deleted, the remaining numbers are 2, 6, and 10.

The 2 next to the erased number 12 is skipped, the 6 is deleted, the 10 next to the 6 is skipped, and the 2 is deleted. At this time, the last number remains:10.

# 2020 **P** Eye Level MATH Olympiad [Grade6]

No.	Answer								
1	12	11	180	21	35	31	24	41	13
2	15	12	546	22	10	32	30	42	1
3	72	13	240	23	37	33	760	43	225
4	56	14	13	24	13	34	75	44	60
5	74	15	13	25	4	35	60	45	22
6	13	16	10	26	406	36	13	46	3
7	618	17	5	27	16	37	3	47	68
8	3	18	9	28	7	38	19	48	44
9	15	19	14	29	86	39	174	49	8
10	9	20	5	30	54	40	10	50	24

### (Sol)

**41.** The following are the two types of square we can draw.



So the total number of squares is 13.

- **43.**  $1 + 3 + 5 + \dots + 27 + 29 = 15 \times 15 = 225$
- 44. + and  $\times$  should be used for numbers that are as great as possible and - and should be used for numbers that are as small as possible. The greatest result we can come up with is as follows:
  - $\begin{array}{l} 9-5+8\times 7=60, \ 9\times 5+8-7=46,\\ 9+5\times 8-7=42 \end{array}$
- **45.** Even numbers have 0, 2, 4, 6 or 8 in the ones place. With these in the ones place, by placing:
  - (1) 0 in the tens place, respectively, we get 5 even numbers: 300, 302, 304, 306 and 308.
  - (2) 0 in the ones place, respectively, we get 18 even numbers: 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 130, 230, 430, 530, 630, 730, 830 and 930.

Therefore, answer is 22. (300 is in both lists)



#### 48. The pattern is as follow:

1	1		
+	+	+	+
-	+	+	
		1	

6	7	10	11	22	23	26	27	38	39	42	43
5	8	9	12	21	24	25	28	37	40	41	44
4	3	14	13	20	19	30	29	36	35	46	45
1	2	15	16	17	18	31	32	33	34	47	48



**50.**  $4 \times 3 \times 2 \times 1 \times 1 = 24$ 

## 2020 **R** Eye Level MATH Olympiad [Grade7]

No.	Answer								
1	5	11	2	21	28	31	36	41	17
2	23	12	7	22	326	32	960	42	27
3	1	13	16	23	838	33	12	43	3
4	31	14	11	24	702	34	17	44	6
5	15	15	13	25	31	35	27	45	518
6	19	16	4	26	8	36	2	46	23
7	13	17	11	27	218	37	30	47	65
8	5	18	17	28	225	38	216	48	15
9	7	19	13	29	571	39	8	49	532
10	1	20	8	30	15	40	24	50	329

#### [Sol]

**41.**  $3 \times 3 + 2 \times 4 = 9 + 8 = 17$ 

- 42. 9÷2=4R1, 17÷3=5R2, 15÷4=3R3
  A÷5=4R4, 23÷6=BR5
  ∴ A=24, B=3
- 43. Blue: 5, Green: 1, Purple: 4, Red: not 2



The positive divisors of 36: 1, 2, 3, 4, 6, 9, 12, 18, 36 The positive divisors of 48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 The numbers that go in the shaded areas are 1, 2, 3, 4, 6 and 12. Total number is 6.

45. + and × should be used for numbers that are as great as possible and - and  $\div$  should be used for numbers that are as small as possible. The greatest result we can come up with is as follows:  $32 \times 16 + 8 - 4 \div 2 = 518$ 



**47.** A=5, B=10



$$5)3783528253$$

7 5

#### A×7=BA

If A=2, then  $2 \times 7=14$  (×) If A=3, then  $3 \times 7=21$  (×) If A=4, then  $4 \times 7=28$  (×) If A=5, then  $5 \times 7=35$  (o) So B=3. 7-A=C, 7-5-C  $\therefore$  C = 2

From the first line of the division,  $A \times 7=BA$ . This is only possible when A=5, and so B=3. We can also know that B7-BA=C, and thus C=2.

50. Start with the largest prime numbers.

7 is multiple in  $63=7\times9$  and  $84=7\times12$ , so we know where the 7 should be.

5 is multiple in  $80=5\times2\times8$  and  $180=5\times4\times9$ , so we know where the 5 should be.

Next, note that  $180=9\times5\times4$ , and considering  $63=7\times9$ , we know that C=9.

From this foundation, the remaining numbers can be easily identified.





## 2020 **R** Eye Level MATH Olympiad [Grade8]

No.	Answer								
1	3	11	68	21	115	31	2	41	955
2	13	12	615	22	27	32	820	42	750
3	5	13	44	23	2	33	24	43	18
4	3	14	324	24	3	34	8	44	3
5	17	15	674	25	7	35	21	45	1)
6	1	16	11	26	79	36	300	46	3
7	7	17	486	27	21	37	6	47	5
8	4	18	148	28	23	38	600	48	33
9	41	19	110	29	13	39	225	49	32
10	61	20	113	30	331	40	423	50	115

### (Sol)

- **41.**  $91 + 92 + 93 + 94 + \dots + 99 + 100$ =  $191 \times 5 = 955$
- 42. The perimeter of the building is calculated as follows: 2×(11+8+6) = 50(cm) So the perimeter is 50×15 = 750(m).
- **43.** 10=5+4+1=5+3+2=4+4+2=4+3+3 So, ABC is 18 as follows: 541, 514, 451, 415, 154, 145, 532, 523, 352, 325, 253, 235 442, 424, 244, 433, 343, 334
- 44. 12345, 21345, 34521
- **45.** Below is how all the six faces of the cube appear.



46. Statements 2, 5, 6 are true.

- 47. If 4 is included and 2 and 6 are not included:  $1 \times 3 \times 4 = 12$ ,  $3 \times 4 \times 5 = 60$ If 2 and 6 are included and 4 is not included:  $1 \times 2 \times 6 = 12$ ,  $2 \times 3 \times 6 = 36$ ,  $2 \times 5 \times 6 = 60$
- **48.** (1) (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) (1) (2) (2) (4) (5) (6) (7) (7) (9)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	1	2	4	7	11	16	22	29
(2)	3	5	8	12	17	23	30	
(3)	6	9	13	18	24	31		
(4)	10	14	19	25	32			
(5)	15	20	26	33				
(6)	21	27	34					
(7)	28	35						
(8)	36							

3 2

If A=2, then  $202-22 \times 2=158 > 22$  (×) So A=3.

- **50.** Let ABC be the three-digit number with the difference between the neighboring digits being 1 or 2.
  - B=0: A=1 or 2, and C=1 or 2, so  $2 \times 2=4$ .
  - B=1: A=2 or 3, and C=0 or 2 or 3, so  $2\times3=6$ .
  - B=2: Since A=1, 3, 4, and C=0, 1, 3, 4, so 3×4=12.
  - B=3: A=1, 2, 4, 5 and C=1, 2, 4, 5, so  $4 \times 4 = 16$ .
  - B=4, 5, 6, 7: As in the case of B=3, so 16.
  - B=8: A=6, 7, 9, and C=6, 7, 9, so  $3 \times 3=9$
  - B=9: A=7, 8, and C=7, 8, so  $2\times 2=4$
  - So total 4+6+12+5×16+9+4=115.