



FIZMAT ELEMENTARY MATH OLYMPIAD

Answers

	1	2	3	4	5	6	7	8	9	10
1 grade	9	18	3	3	8	15	13	I-Daniyar, II-Aidyn, III-Tamerlan	6 children	3 days
2 grade	1068	27	6	155	25	6	13	Nursultan	96	3527
3 grade	1	150	15	243	552	10	109	08:08	32	Damir - 65, Farhad — 35, Dauren — 20
4 grade	11:45	240	3527	109	7	144	17.06.2345	9 Indian and 8 pale faced	44	10
5 grade	25	10024	14	20	504	17.06.2345	612	9 Indian and 8 pale faced	192	1100



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Marking system of 8-10 problems

1st grade:

8. The first boy said that he was Aydin, it could not be Aydin because he was lying and could not be Tamerlan, because he was telling the truth. So the first boy is Daniyar. The second boy is Aydin, because from the condition he is deceiving, and cannot say that he is not Daniyar. The third boy is Tamerlan.
- **Answer without explanation - 2 points**
 - **Answer + partial explanation – 3 points.**
 - **Full explanation - 5 points**
9. The sum of the ages of boys is equal to the age of the girl, and after two years the difference was eight years, which means the sum of the boys' years increased by 10 ($8 + 2$), which means there are 5 boys in the family and one girl. There are 6 children in the family.
- **Answer without explanation - 2 points**
 - **Answer + partial explanation – 3 points.**
 - **Full explanation - 5 points**
10. The working week is five days, two teachers work a day, it turns out ten working days in total. Sara worked for 3 days, and Alua worked for 4 days, so Inkar worked for $10 - 3 - 4 = 3$ days.
- **Answer and example without explanation - 2 points**
 - **Full solution - 5 points**



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2nd grade:

8. If Beksultan is lying, then Nursultan is also lying. We have only one boy who is a liar, so Beksultan and Nursultan are telling the truth. So we have only one liar, Aisultan left. Then it turns out he lied that Nursultan took 2nd place, then Nursultan took 1st place.
- **Answer and example without explanation - 2 points**
 - **Full solution - 5 points**
9. Suppose all numbers are two-digit $25 \times 2 = 50$. 21 digits are missing, so the last 21 numbers are three-digit, and the first 4 are two-digit. Therefore, the two-digit numbers are 96, 97, 98, 99.
- **Answer without explanation - 2 points**
 - **Answer + number of two or three digits – 3 points**
 - **Full solution - 5 points**
10. We have 4 incorrect codes 3725 7523 3257 2537. In them the numbers 3 7 3 2. 3 repeated 2 times, it means in fact the first number is 3. Now for the second place they have 7 5 2 5. 5 repeated 2 times, then the second number is 5. We also understand that in third place is 2 and in fourth place is 7.
- **Answer and example without explanation - 2 points**
 - **Full solution + correct answer - 5 points**



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3rd grade:

8. The number 8 has the largest number of sticks, then followed by 0, 6 and 9. So you need to use these numbers to compile our time.
- **Answer and example without explanation - 2 points**
 - **Full solution + correct answer - 5 points**
9. Suppose all numbers are two-digit $85 \times 2 = 170$. 17 digits are missing, so the last 17 numbers are three-digit, and the first 68 are two-digit. Therefore two-digit numbers 32, 33, 34, ... 99.
- **Answer without explanation - 2 points**
 - **Answer + number of two or three digits – 3 points**
 - **Full solution - 5 points**
10. In the end, everyone had $120/3 = 40$ chips. It needs to be calculated from the end.
- Before the 3rd exchange**
- $40/2=20$ - Damir
 $40/2 =20$ - Farhad
 $120-(20+20)=80$ - Dauren
- Before the 2nd exchange**
- $20/2=10$ - Damir
 $80/2=40$ - Dauren
 $120-(40+10)=70$ - Farhad

In the beginning, before Damir shared:

$70/2=35$ Farhad's chips

$40/2=20$ Dauren's

$120-(35+20)=65$ Damir's

- **Answer without explanation - 2 points**
- **Full solution - 5 points**



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4th grade:

8. An Indian cannot tell "you are Indian" to another Indian because he has to tell a lie. An Indian cannot tell "you are Indian" to a pale-faced person because he must tell the truth. Therefore, everyone who said "you are an Indian" is pale-faced. Likewise, all who said "you are pale-faced" are Indians. So there are 9 Indians and 8 pale-faced.

- **Answer without explanation - 2 points**
- **Full solution - 5 points**

9. **Multiplications that give 16:**

- 1) $4*4$ - does not fit. According to the problem statement, the factors must be different.
- 2) $2*8$
- 3) $1*16$

Multiplications that give 225:

- 1) $3*75$
- 2) $5*45$
- 3) $1*225$
- 4) $9*25$
- 5) $15*15$

The only variant of four that fits is 2, 8, 9, 25. The sum of the four numbers is 44.

- **Answer - 2 points**

- **-1 point if possible option is missed**
- **Full solution - 5 points**

10. Let's designate the number of levels in the game as $2X$. Since 5 have passed half of the game, two have passed three levels and two have left to pass one level at a time, write down the equation and solve it:

$$5 * X + 2 * 3 + 2 * (2*X-1) = 5*2X$$

$$X = 4$$

Answer: 8 levels.

- **Answer - 2 points**
- **Full solution - 5 points**



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5th grade:

8. An Indian cannot tell "you are Indian" to another Indian because he has to tell a lie. An Indian cannot tell "you are Indian" to a pale-faced person because he must tell the truth. Therefore, everyone who said "you are an Indian" is pale-faced. Likewise, all who said "you are pale-faced" are Indians. So there are 9 Indians and 8 pale-faced.
- **Answer without explanation - 2 points**
 - **Full solution - 5 points**
9. Each time he passes through the gate, $\frac{1}{4}$ is taken from him and he is left with $\frac{3}{4}$. So you need to divide by 3 and multiply by 4 to get how much was before. The merchant goes through 3 gates, so this operation must be done 3 times.
- $$81:3*4=108$$
- $$108:3*4=144$$
- $$144:3*4=192$$
- **Answer - 2 points**
 - **Explanation + answer - 5 points**
10. The difference between the train speeds is 24 km / h, which means that in 5 minutes a fast train will travel more than a slow one by $24/60 * 5 = 2$ km. To overtake the fast train had to travel the length of the slow train and then travel its own length. Since the length of the fast train is 900 m and the sum of the two lengths is 2000 m, this means that the length of the slow train is 1100 m.
- **Answer - 2 points**
 - **Explanation + answer - 5 points**