Autumn 2018./2019.

SCHOOL	
TEAM NUMBER	
CATEGORY	**D2**
COMMISSIONER	

	Student's name and surname	Year	Mentor's name and surname
1.			
2.			
3.			
4.			

ANSWERS:

5th year		6th year		7th year		8th year	
5.1.		6.1.		7.1.		8.1.	
5.2.		6.2.		7.2.		8.2.	
5.3.		6.3.		7.3.		8.3.	
5.4.		6.4.		7.4.		8.4.	
5.5.		6.5.		7.5.		8.5.	
5.6.		6.6.		7.6.		8.6.	
5.7.		6.7.		7.7.		8.7.	
5.8.		6.8.		7.8.		8.8.	
5.9.		6.9.		7.9.		8.9.	
5.10.		6.10.		7.10.		8.10.	
5.11.		6.11.		7.11.		8.11.	
5.12.		6.12.		7.12.		8.12.	

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CORRECT ANSWER : 10 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –2 pts

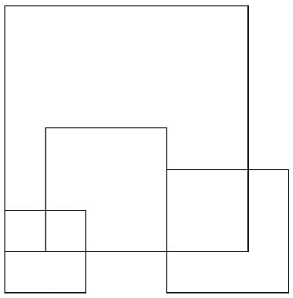
5.1. Evaluate $2+2\cdot 2:2\cdot 2$

A.	B.	C.	D.	E.
6	3	2	4	We don’t want to answer

5.2. The Croatian football team landed at the Zagreb Airport at 3:31 pm. They arrived at the main square at 9:25 pm. How many minutes did they travel from the airport to the main square?

A.	B.	C.	D.	E.
Less than 300 min	More than 400 min	354 min	366 min	We don’t want to answer

5.3. How many quadrilaterals are there in the following picture?



A.	B.	C.	D.	E.
6	7	8	9	We don’t want to answer

CORRECT ANSWER: 20 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –4 pts

5.4. The lengths of the sides of the triangle are three consecutive even numbers. If the perimeter of that triangle is 150 cm, what is the product of the lengths of that triangle?

A.	B.	C.	D.	E.
124800	140400	157248	Can't be determined	We don’t want to answer

5.5. Calculate the sum of all odd three-digit numbers with different digits (digits can't be repeated) written using digits 2, 3, and 5

A.	B.	C.	D.	E.
2220	1688	1336	1101	We don’t want to answer

5.6. Domino tiles are small rectangular tiles split into two squares. These squares can be empty or have one to six dots. How many different domino tiles exist?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
49	36	18	28	

5.7. Write down the first number greater than 2018 that has the same digits as 2018. What is the difference between these two numbers?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
Less than 50	63	90	Greater than 100	

CORRECT ANSWER: 30 pts	**ANSWER „E" : 0 pts**	**FALSE ANSWER: –6 pts**

5.8. The perimeter of the rectangle is 36 cm. The lengths of its sides are odd natural numbers. What **can't** be the area of that rectangle?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
55 cm^2	77 cm^2	17 cm^2	65 cm^2	

5.9. Luke's book has 123 pages. How many digits in total were used to mark all the pages of that book?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
122	276	258	261	

5.10. For the birthday party, organizers put five round tables, and around each table they put chairs numerated with numbers 1, 2, 3, etc. If chair number 4 is opposite to chair number 10, how many chairs are there in total?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
60	50	65	Can't be determined	

5.11. In how many different ways can Jan pay for chocolate worth 12 kuna, if she has coins of 1, 2, and 5 kn?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
10	13	8	12	

5.12. Apple, Cherry, and Peach are three sisters. The sum of their ages is 28 years. Peach is three years older than Cherry, while Cherry is twice as old as Apple. What is the product of their ages?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
Manji od 100	195	550	Veći od 600	

CORRECT ANSWER : 10 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –2 pts

6.1. World champion Tin Srbić practises every day, except on Sundays, from 7:15 am to 9:45 am, and then again from 4:45 pm to 7 pm. How much time does he spend training every week?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
18 hours 45 minutes	22 hours 30 minutes	23 hours 45 minutes	28 hours 30 minutes	

6.2. Domino tiles are small rectangular tiles split into two squares. These squares can be empty or have one to six dots. How many different domino tiles exist with a square that has five dots?

A.	**B**.	**C**.	**D**.	**E**. We don’t want to answer
56	45	35	Less than 20	

6.3. Which of the given numbers is the least?

A.	**B**.	**C**.	**D**.	**E**. We don’t want to answer
1.1203	1.203	1.56	1.11339	

CORRECT ANSWER: 20 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –4 pts

6.4. Jacob has imagined a number. He subtracted 0.09 from it, then he doubled it. He increased the result by 3.5, and then he halfed it. What's the initial number he imagined, if the final result is 6?

A.	**B.**	**C.**	**D.**	**E.** We don’t want to answer
0.16	4.34	5.15	12	

6.5. How many divisors, in the set of natural numbers, does the number 96 have?

A.	**B**.	**C**.	**D**.	**E**. We don’t want to answer
13	12	11	10	

6.6. Footballers Luke, Mario, John and Dominic are shooting penalties. Luke scored 6 goals out of 10 shots, Mario scored 7 goals out of 11 shots, John scored 9 goals out of 12 shots, and Dominic scored 10 shots out of 14 shots. Which one of them was the most successful?

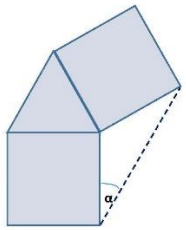
A.	**B**.	**C**.	**D**.	**E**. We don’t want to answer
Luke	Mario	John	Dominic	

6.7. A square is divided by three parallel lines into four different rectangles. If the sum of perimeters of all rectangles is 150 cm, what is the area of the square?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
156.25 cm^2	60 cm^2	225 cm^2	Can't be determined	

CORRECT ANSWER: 30 pts	**ANSWER „E" : 0 pts**	**FALSE ANSWER: –6 pts**

6.8. In the picture, an equilateral triangle and two squares are shaded. What is the measure of the angle α?



A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
20°	45°	55°	30°	

6.9. Determine the least four digit number divisible by 15, 20 and 24. Subtract 987 from that number. What is the product of the digits of that number?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
36	0	27	None of the above	

6.10. John, Jack and Peter collected 210 stickers in total. One day, John decided to keep one third of his stickers, and share the rest of his stickers equally between Jack and Peter. Jack decided to return 20 stickers to John, and gave Peter 15 of his stickers. After all of that, all three of them had the same number of stickers. How many stickers did Jack and Peter have together at the beginning of that day?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
80	70	60	Can't be determined	

6.11. If the remainder, when dividing a natural number *n* by 31, equals 19, what is the remainder when dividing the number *n* + 199 by 31?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
22	1	13	None of the above	

6.12. The length of one side of a rectangle is double the length of the other. If the longer side is increased by 4 cm, and the shorter side is increased by 5 cm, the area of the new rectangle will be 90 cm^2 greater than the area of the initial rectangle. What is the difference between the longer and shorter side in the new rectangle?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
5 cm	4 cm	3.5 cm	Can't be determined	

CORRECT ANSWER : 10 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –2 pts

7.1. Thirteen rose bushes are planted at equal distances among a 123 meter path. What is the distance between 2 consecutive bushes? Round the result to two decimal places.

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
9.45 m	10 m	9.46 m	10.25 m	

7.2. In an icosceles triangle, the angle opposite the base has a measure of 20°. U jednakokračnom trokutu kut nasuprot osnovici je 20°. What is the angle between the angle bisectors of the angles next to the base?

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
40°	50°	100°	160°	

7.3. Which one of the following statements doesn't always have to be correct?

A. Diagonals of the square half each other	**B**. Diagonals of the parallelogram are of equal length	**C**. Diagonals of the rectangle are of equal length	**D**. Diagonals of the rhombus half each other	**E**. We don't want to answer

CORRECT ANSWER: 20 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –4 pts

7.4. How many ordered pairs (x,y) satisfy the equation $\frac{6}{x}=\frac{y}{4}$?

A.	**B**.	**C**.	**D**. None of the above	**E**. We don't want to answer
4	8	16		

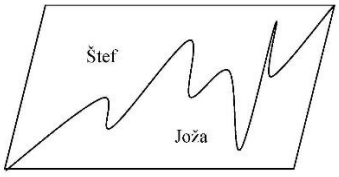
7.5. It takes 32 days for grandma, and 24 days for grandpa to harvest the orchard. If the grandparents and their granddaughter take 12 days to harvest the orchard, how many days would it take for the granddaugther to harvest the orchard by herself?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
More than 80 days	64	Less than 40 days	Can't be determined	

7.6. What number needs to be added to the numerator and the denominator of the fraction $\frac{1}{5}$ to get $\frac{5}{11}$?

A.	**B.**	**C.**	**D.** None of the above	**E.** We don't want to answer
$\frac{7}{3}$	5	7		

7.7. Stephan and Joe divided the property in the shape of a parallelogram as shown in the picture, and they want to fence off their individual sectors? Which one of the following statements is surely correct?



A. Stephan's and Joe's properties have the same area	**B.** Stephan's property is larger than Joe's	**C.** Stephan's and Joe's property have the same perimeter	**D.** None of the above	**E.** We don't want to answer

CORRECT ANSWER: 30 pts	**ANSWER „E“ : 0 pts**	**FALSE ANSWER: –6 pts**

7.8. For the given trapesium, the following stands $|BC| = |CD| = |DA| = \frac{1}{2}|AB| = a$. Determine the distance between point C and diagonal $\overline{BD}$.

A. $\frac{a}{4}$	**B.** $\frac{a}{3}$	**C.** $\frac{a}{2}$	**D.** Can't be determined	**E.** We don't want to answer

7.9. Calculate $1-2+3-4+5-6+...-50+51$

A. 25	**B.** 26	**C.** –25	**D.** None of the above	**E.** We don't want to answer

7.10. How many different three digit numbers are there, so that they are divisible by 15 and all of the digits are odd?

A. 8	**B.** 5	**C.** More than 10	**D.** 9	**E.** We don't want to answer

7.11. With how many zeroes does the product of first hundred natural numbers end?

A. 10	**B.** 20	**C.** 24	**D.** Can't be determined	**E** We don't want to answer

7.12. Each one, Anthony, Spencer and Greg are in love with one of three best friends from the class (Mary, Claire and Cate). Which girl does Spencer like if only one of the following statements is correct? Ante, Šime i Jure vole jednu od tri najbolje prijateljice iz razreda (Mare, Cvita i Kate) i svaki je zaljubljen u različitu djevojku. Koju djevojku voli Šime ako je samo jedna od izjava točna:

- Spencer likes Mary,
- Greg doesn't like Mary,
- Anthony doesn't like Claire?

A. Mary	**B.** Claire	**C.** Cate	**D.** Can't be determined	**E.** We don't want to answer

CORRECT ANSWER : 10 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –2 pts

8.1. Vertices of the quadrilateral ABCD are $A(1, -1)$, $B(6, 7)$, $C(1, 7)$ i $D(-2, 3)$. Calculate its area.

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
32	30	28	24	

8.2. Mary's grades from physics are 5, 1, 4, 4, 5 i 2. What's the lowest grade Mary can get on the final exam, so her average grade is „very good“?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
5	4	3	2	

8.3. Which one of the following numbers **can** be equal to the number of diagonals of a polygon?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
45	35	30	15	

CORRECT ANSWER: 20 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –4 pts

8.4. For the lengths of the sides of the triangle ABC stands $a : b = 2 : 3$ i $b : c = 5 : 4$. If the perimeter is 111 cm, what's the length of the triangle's shortest side?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
45 cm	40 cm	36 cm	30 cm	

8.5. The sum of three numbers is 515. The third number is 25% less than the second number, and the first number is 10% greater than the third number. What's the value of the smallest of these three numbers?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
Less than 100	150	200	Can't be determined	

8.6. What stands for the real number, for the system $2x + y = 1$ and $ay = 3 - 6x$ has an infinite number of solutions?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
$a < 1$	$1 < a < 2$	$2 < a < 4$	$a > 4$	

8.7. A number is a palindrome whoch reads same backward as forward. For example, number 12321. What is the sum of the largest even four digit, and the smallest odd five-digit palindrome whose digits are not all the same?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
19889	18999	19890	None of the above	

CORRECT ANSWER: 30 pts	ANSWER „E“ : 0 pts	FALSE ANSWER: –6 pts

8.8. A circle is circumscribed to the triagle ABS. Vertices of that triangle are dividing the circle in the ratio 7:6:5. Which one of the following can be the measure of the angle of the triangle ABC?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
50^0	40^o	45^o	35^o	

8.9. The price of shoes is decreased by 20 %. For which percentage do we have to increase new price, so that it is 5 % more than the old price?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
15%	31.25%	25%	None of the above	

8.10. The lengths of two sides of the triangle are 8.23 cm and 2.15 cm. If the length of the third side is a natural number, how many triangles like that exists?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
4	3	2	Can't be determined	

8.11. Find the area of the square whose sides are on the follosing lines: $y = x + 3$ i $y = x - 3$.

A.	**B**.	**C**.	**D**.	**E**. We don't want to answer
9	36	18	Can't be determined	

8.12. How many solutions has the equation $xy + 2y - 3x = 15$ if x and y are integers?

A.	**B.**	**C.**	**D.**	**E.** We don't want to answer
8	4	2	None of the above	