PADEREWSKI PRIVATE HIGH SCHOOL

ENTRANCE EXAM
MATHEMATICS

Instructions for the candidate:

1. *Write down all crucial calculations.*
2. *Do not use a calculator.*
3. *Work independently.*

Good luck!

Data:

13th April 2019 .

Work time:

90 mins

Max points:

40

Exercise 1. (2 points)

The building with a wall-clock was built in 1533. It was renovated in MCMXC. How many years passed since the erection till the renovation?.

Exercise 2. (2 points)

Imagine You have a map with scale 1: 250 000. The distance between cities A and B on the map equals 7cm. Calculate **real distance** between the cities. Give Your answer in km.

Exercise 3. (3 points)

Write the value of the following expression as a power of 3: $\frac{3^{16}\cdot\left(3^4\right)^2}{3^{10}}$.

Exercise 4. (2 points)

The following numer is given: $a = 3\sqrt{2} - 4$. Find the numer, that is:

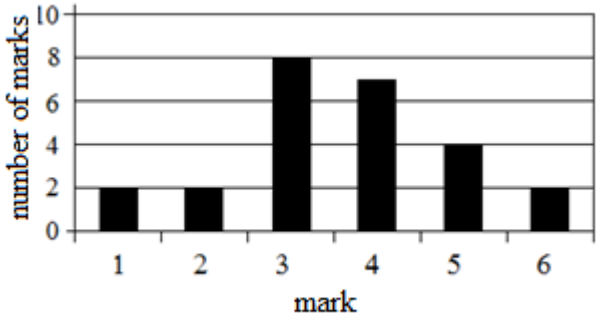
a) bigger by 2 then the numer *a*,
b) 2 times bigger then the numer *a*.

Exercise 5. (2 points)

There were ***m*** men and ***w*** women inside the bus. 2 men and 3 women got of the bus at the bus stop and at the same time 5 men and 2 women got into the bus. Write as an algebraic expression the number of passengers inside the bus when it left the bus stop.

Exercise 6. (4 points)

The following diagram presents results of the maths test conducted in a certain class.



Answer the following questions:

a) How many students wrote the test?
b) What is the average mark for the test?
c) Give a percentage of number of marks 5 and 6 out of the whole number of marks.?
d) How much percent more were the number of marks 4 then the number of marks 5?

Exercise 7. (2 points)

48 participants took part in the chess tournament. The numbers of participants from classes 6, 7 and 8 are in a 3: 8: 5 ratio. What percentage of the participants in the tournament were students from class 7?

Exercise 8. (3 points)

The Smiths have three daughters and one son. The average age of all children in this family is 10 years, and the average age of all daughters is equal to 8 years. How old is the son of the Smiths?

Exercise 9. (3 points)

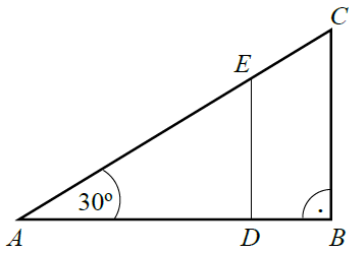
Half of the number of participants of the excursion were born in Poland, every third was born in Germany and five others in France. How many participants took part in the excursion?

Exercise 10. (3 points)

Three students were candidates for the president of the class: Jack, Helena and Greg. Each student in this class gave one voice. Jack received 9 votes, which constituted 36% of all votes. Helena received 6 votes more than Greg. Calculate how many votes Helena received, and how many - Greg.

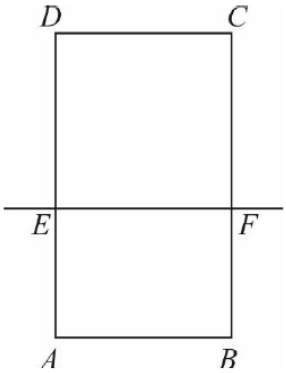
Exercise 11. (2 points)

Points D and E are marked on the sides of the right angled triangle ABC. The segment DE divides the triangle ABC into two polygons: the right angled triangle ADE and the quadrilateral DBCE, as in the drawing. Segment AB has a length of $4\sqrt{3}$ cm, and the segment DE has a length of 3 cm. Calculate the length of the segment EC.



Exercise 12. (2 points)

A line EF divides the rectangle ABCD into an EFCD square with a perimeter of 32 cm and an rectangle ABFE with a perimeter by 6 cm smaller than the perimeter of the square EFCD. Calculate the length of the segment AE.



Exercise 13. (2 points)

Calculate the area of the parallelogram with sides of 10 cm and 4 cm if the angle between them has a measure of 30 .

Exercise 14. (3 points)

In an isosceles trapezium with bases of 4 cm and 16 cm, the area is 80 cm^2. Calculate the length of the trapezium arm. Make the appropriate drawing

Exercise 15. (2 points)

John forgot the four-digit code to the gate of his home. He only remembered that the first two digits were 4 and 7, and all four digits of this code formed an even number divisible by 9. Give all the possibilities of the code.

Exercise 16. (3 points)

Jack cut out a net of the square based pyramid from a square page with a side length of 16 cm as shown in the picture. The height of the side of this pyramid is 1 cm shorter than the length of the edge of the base. Calculate the total surface area of this pyramid. Write down the calculation.