REPUBLIKA HRVATSKA

XV. GIMNAZIJA

International Baccalaureate Department

Middle Years Programme

ENTRANCE EXAM 2018

MATHEMATICS

60 minutes

PASSWORD (3 digits and 5 letters)

digits letters

1. The password consists of the combination of 3 digits and 5 letters written together.
2. Only black or blue ink is allowed for the test writing.

Date _____

Points gained from the test ____ / 42

Entrance exam points ____ / 2

1. (2 pts)

Evaluate:

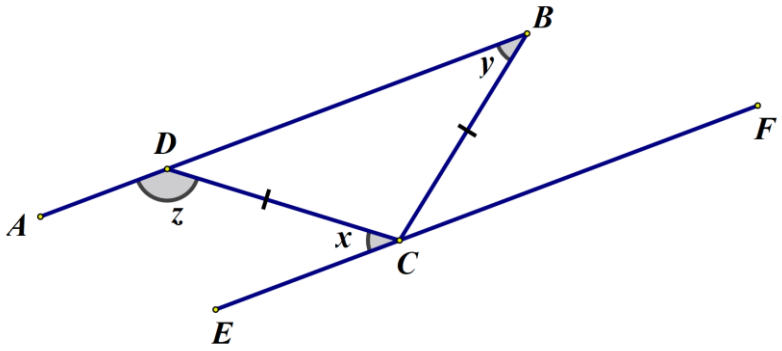
a) $\frac{5}{3}:\left(2-\frac{3}{4}\right)-\frac{1}{3}=$

b) $\left(\frac{\frac{9}{20}-0.3^2}{4.5-5\cdot\sqrt{1.21}}\right)\cdot\frac{5}{9}=$

Answer: a) _____ b) _____

2. (2 pts)

If AB is parallel to EF, $|DC|=|BC|$, $y=30°$, calculate x, z.



Answer: _____

3. (2 pts)

Complete the following expression:

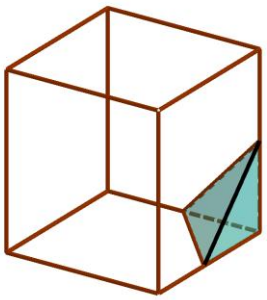
$\square\cdot\left(\square+\square\right)\cdot\left(\square-\square\right)=2x^2-8$

4. (2 pts)

Mary has a certain number of coins.
John says: *I have 5 times more coins than you and two more*.
Then Mary says: *If I divide your number of coins by 5.5 you will have exactly the same number of coins as me*. What is the number of coins that Mary has?

Answer: _____

5. 2 pts	Solve the system of equations: $\begin{cases} 5x = 2 - y \\ x = 13 + 4y \end{cases}$ *Answer*: _____
6. 4 pts	Aaron is staying at a hotel that charges $99.95 per night plus tax for a room. A tax of 8% is applied to the room rate, and an additional onetime untaxed fee of $5.00 is charged by the hotel. a) Which formula represents Aaron's total charge, in dollars, for staying *x* nights? b) How many nights Aaron could stay at hotel for $1520? *Answer*: _____
7. 4 pts	The toll rates for crossing a bridge are 35 kn for a car and 81 kn for a truck. During a two-hour period, a total of 165 cars and trucks crossed the bridge, and the total collected in tolls was 7845 kn. Find the number of cars and the number of trucks that crossed the bridge during two hours? *Answer*: _____

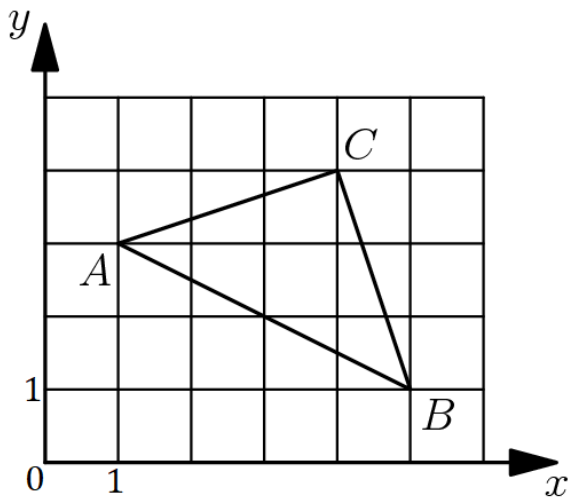
8. 4 pts	One corner of a solid cube is removed by cutting through the midpoints of three adjacent sides. Side of a cube is 8 cm.  a) Calculate the volume of the piece removed? b) What is the surface area of the part of the cube that remained after this piece is removed? *Answer*: _____
9. 4 pts	There are 743 milestones along the highway. Between the first and the second milestone 3 advertisement posters were placed, between the second and the third milestone 4 posters, between the third and the fourth 3 posters, and so on to the end of the highway. How many posters were placed along the highway? *Answer*: _____

10. In the given coordinate system points A, B and C are vertices of the triangle ABC.

a) Prove that the given triangle is right angled.

4 pts

b) What percentage of the given 6×5 grid is covered by the triangle ABC?

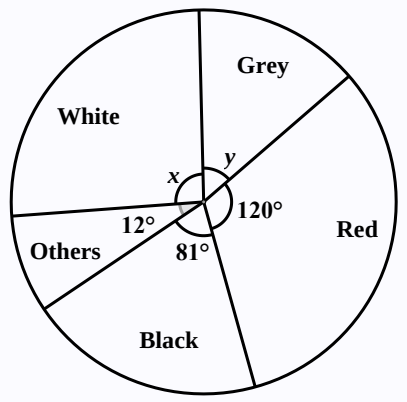


Answer: _____

11. This sector graph illustrates the sales of different colour of cars in a certain car shop.

a) What percentage of sales does red car have?

4 pts



b) If grey car accounts for 15% of total sales, calculate the angles x and y.

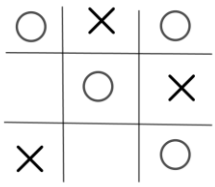
Answer: a) _____ b) _____

12.

6 pts

Noughts and crosses

One winning line (any horizontal, vertical or diagonal sequence of 3 noughts or crosses) in a noughts and crosses game is shown:



a) How many possible winning lines are there on a 3×3 grid?

b) How many winning lines are there on different sizes of a board:

$n \times n$ size of the grid	2×2	3×3	4×4	5×5	6×6
k Number of winning lines					

c) How many winning lines are there on $n \times n$ grid?

Answer: _____