REPUBLIKA HRVATSKA
XV. GIMNAZIJA
International Baccalaureate Department
Middle Years Programme

ENTRANCE EXAM 2024

MATHEMATICS, 2. 7. 2024.

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 ____ / 30

Entrance exam points ____ / 4

1. 1 pt

Evaluate $\left(1-\sqrt{0.16}\right)^2 : \left(0.7-\frac{27}{40}\cdot\frac{4}{9}\right) =$

A. $\frac{18}{125}$

B. $\frac{9}{10}$

C. $\frac{3}{2}$

D. $\frac{162}{5}$

2. 1 pt

The ages of two children are in the ratio 3 : 4. In 8 years their ages will be in the ratio 5 : 6. How old are they now?

A. 3 and 4

B. 7 and 10

C. 9 and 12

D. 12 and 16

3. 1 pt

1	12	111	2
87	9	18	56
25	73	45	102

Peter is randomly choosing a number from the given table. What is the probability that Peter chooses a number **not divisible** by 3?

A. $\frac{1}{3}$

B. $\frac{5}{12}$

C. $\frac{1}{2}$

D. $\frac{7}{12}$

4.

1 pt

Lines p and q are parallel and $|AC| = |BC|$. What is the measure of angle φ, at point C?

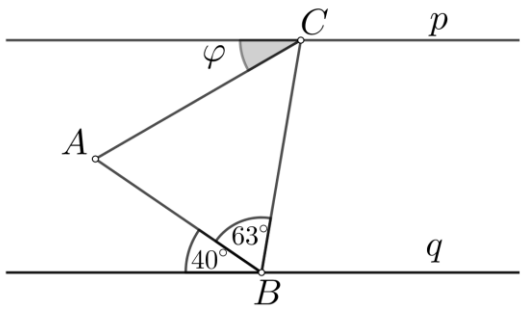


Diagram is not in a scale.

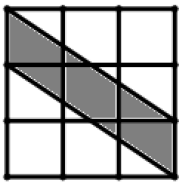
A. 23°
B. 40°
C. 54°
D. 77°

5.

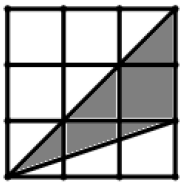
1 pt

Which of the following shaded regions has an area **different** from the other shaded regions?

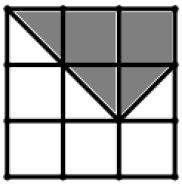
A.



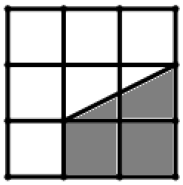
B.



C.

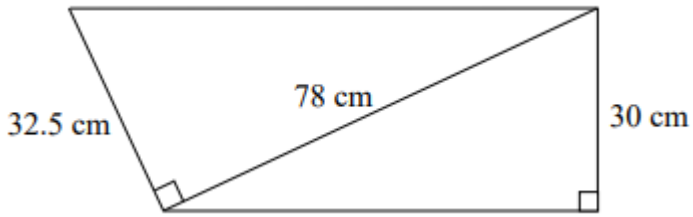


D.



In the following tasks, show **all your work** (sketches, procedure, calculations) and write the **answer** in the space provided.
If you solve a part of the task by heart, explain and write how you did it.

6. 1 pt	Find the product of the Highest Common Factor (HCF) and Lowest Common Multiple (LCM) of 108 and 270. *Answer*: _____
7. 1 pt	Solve for x: $x-2(x+0.5)=\frac{2x-1}{3}$. *Answer*: _____

8. 2 pts	If 5 is subtracted from a certain number and that result is than halved, the answer is 6. What is the number? *Answer:* _____
9. 2 pts	Find the area of the trapezium below.  *Answer:* _____

10. 2 pts	After swimming 18 lengths of a 50 m swimming pool, Nancy has completed 60% of her usual training. How far does she have left to swim? *Answer:* _____
11. 2 pts	Solve the system of equations: $\begin{cases} 2y - \frac{x}{3} = 1 \\ 0.1x = y - 1 \end{cases}$ *Answer:* _____

12. Tom has more money than Felix. If Tom gave Felix 37 euros they would have the same amount. While if Felix gave Tom 92 euros, Tom would then have triple as much as Felix. How much does each one actually have?

3 pts

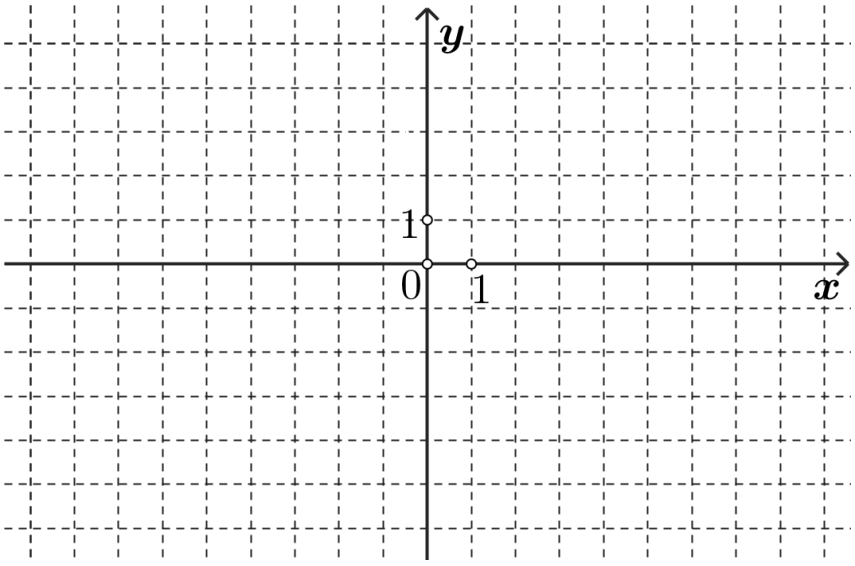
Answer: _____

13. In the given coordinate system, plot the points (1, 1), (5, 1) and (3, 2). Join the points to form a triangle and label by **A**.

a) Translate the triangle **A** for 2 units to the right and 5 units down and label by **B.**

3 pts b) Reflect the triangle **B** in the line $x = -1$ and label by **C.**

c) Describe the transformation that maps triangle **C** directly onto triangle **A**.

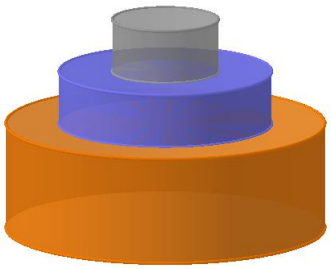


Answer: _____

14.

4 pts

A wedding cake consists of three cylinders stacked on top of each other. The dimensions are as follows:



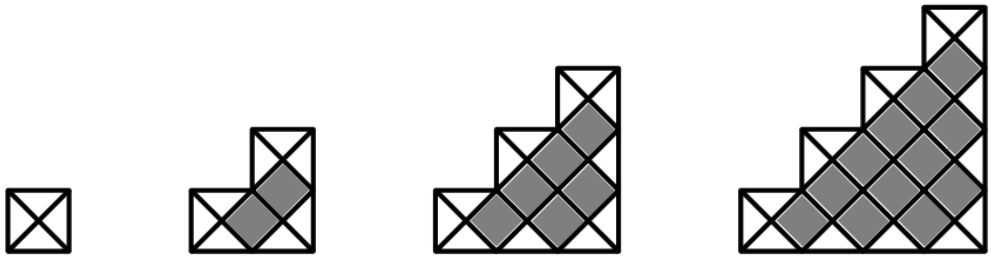
- The top layer has the same radius and height. Its base area is 100π cm^2.
- The middle layer has the same height as the top layer and a radius that is double that of the top layer.
- The bottom layer has the height that is double that of the top layer, and the radius that is triple that of the top layer.

All sides and top surfaces are to be covered in icing, but not the base of the cake.
Find the surface area of the cake that needs to be iced. Round your answer to the nearest square centimetre.

Answer: _____

15.

5 pts



Here are the first four diagrams of a sequence.
a) Fill the table.

Diagram number (n)	1	2	3	4	5	6	7
Number of triangles (t)	4	8	12				
Number of squares (s)	0	2	6				

b) How many triangles will there be in diagram number 20? Explain your answer.

Answer: _____

c) How many squares will there be in diagram number 20? Explain your answer.

Answer: _____

TURN THE PAGE!

d) Can you write a general rule for the number of triangles in diagram number *n*?

Answer: _____

e) Can you write a general rule for the number of squares in diagram number *n*?