



AZƏRBAYCAN RESPUBLİKASI
TƏHSİL NAZİRLİYİ



AZƏRBAYCAN RESPUBLİKASININ
TƏHSİL İNSTITUTU



KENQURU

RİYAZİYYAT

AZƏRBAYCAN 2022

Name : _____

Surname : _____

Father's name : _____

School : _____

Grade 9-10

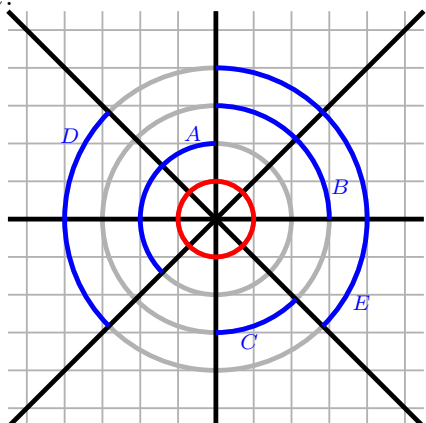
English section

The examination shall last 90 minutes.
Wrong answers do not affect correct ones.
The results will be published on www.ttm.edu.az.



3 points

1. Four lines intersect forming eight equal angles. Which blue arc has the same length as the red one?



- (A) A (B) B (C) C (D) D (E) E

2. The product of the digits of a 10-digit integer is 15. What is the sum of the digits of this number?

- (A) 8 (B) 12 (C) 15 (D) 16 (E) 20

3. Bella is older than Charlie and younger than Lily. If Teddy is older than Bella, which two could be the same age?

- (A) Charile and Teddy (B) Teddy and Lily
 (C) Lily and Charlie (D) Bella and Lily
 (E) Teddy and Bella

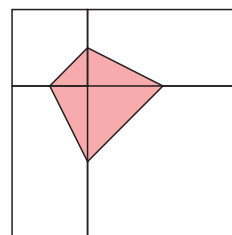
4. How many positive three-digit integers are divisible by 13?

- (A) 68 (B) 69 (C) 70 (D) 76 (E) 77

4 points

5. The square is divided into 2 squares and 2 equal rectangles. The vertices of the shaded quadrilateral of area 3 are the midpoints of the sides of the squares. What is the area of the unshaded part of the square?

- (A) 12 (B) 15 (C) 18 (D) 21 (E) 24



3 points

6. How many real solutions does the equation $(x - 2)^2 + (x + 2)^2 = 0$ have?

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

5 points

7. If N is a positive integer, how many integers are between $\sqrt{N^2 + N + 1}$ and $\sqrt{9N^2 + N + 1}$?

- (A) $N + 1$ (B) $2N - 1$ (C) $2N$ (D) $2N + 1$ (E) $3N$

3 points

8. Let a, b, c be non zero numbers. It is known that the numbers $-2a^4b^3c^2$ and $3a^3b^5c^{-4}$ have the same sign. Which of the following is definitely true?

- (A) $ab > 0$ (B) $b < 0$ (C) $c > 0$ (D) $bc > 0$
 (E) $a < 0$

4 points

9. Martina is playing in an 8 player tournament. She knows she will beat everyone except Ash, who will beat everybody. In the first round, players are organised randomly into four pairs, and the winner of each match proceeds to the second round. In the second round, there are two matches and the winners of these matches proceed to the final. What is the probability that Martina gets to the final?

- (A) 1 (B) $1/2$ (C) $2/7$ (D) $3/7$ (E) $4/7$

5 points

10. The vertices of a 20-gon are numbered from 1 to 20 in such a way that the numbers of adjacent vertices differ by 1 or 2. The sides of the 20-gon whose ends differ only by 1 are colored red. How many red sides are there?

- (A) 1 (B) 2 (C) 5 (D) 10
 (E) there are multiple possibilities

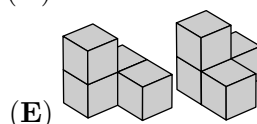
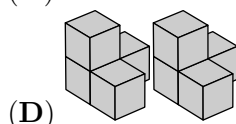
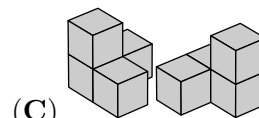
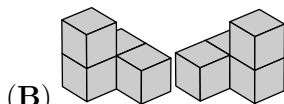
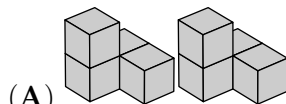
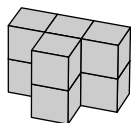
3 points

11. If you write, in increasing order, all the integers from 2 to 2022 which use only 0s and 2s, what is the number in the middle of your list?

- (A) 200 (B) 220 (C) 222 (D) 2000 (E) 2002

4 points

12. Which two pieces can be put together to build a shape that looks like this?



3 points

13. On Henry's smartphone, the diagram shows how much time he spent last week on each of his apps.

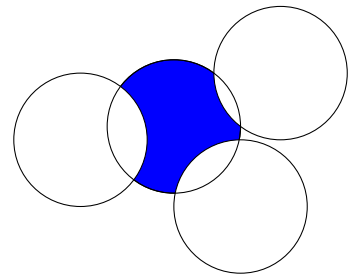


The apps are ordered from greatest to least time spent. This week he spent half the time on just two apps, and equal time on the other two. What cannot be the diagram for this week?

- (A) (B) (C) (D) (E)

14. Four circles, each of radius 1, intersect as shown. What is the perimeter of the shaded region?

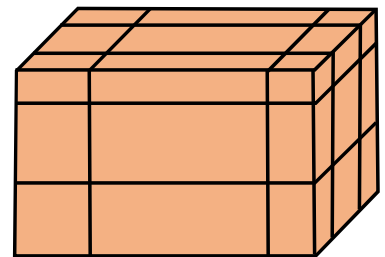
- (A) π (B) $\frac{3\pi}{2}$ (C) Some number between $\frac{3\pi}{2}$ and 2π
 (D) 2π (E) π^2



4 points

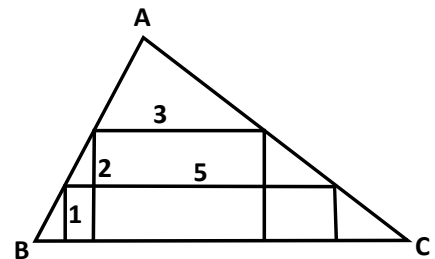
15. A cuboid of surface area S is cut by six planes as shown. Each plane is parallel to a face, but its distance from the face is random. Now the cuboid is separated in 27 smaller parts. What is, in terms of S , the total surface area of all 27 smaller parts?

- (A) $2S$ (B) $\frac{5}{2}S$ (C) $3S$ (D) $4S$
 (E) none of the previous



16. Two rectangles are inscribed inside a triangle ABC . The dimensions of the rectangles are 1×5 and 2×3 , respectively, as shown. How long is the triangle's altitude from A ?

- (A) 3 (B) $\frac{7}{2}$ (C) $\frac{8}{3}$ (D) $\frac{6}{5}$
 (E) none of the previous



3 points

17. In a straight line we have marked the points A, B, C, D in this order, as seen in the figure.



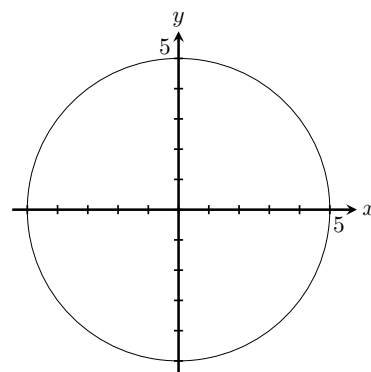
We know that the distance between A and C is 12cm and between B and D , 18cm . What is the distance between the midpoints of the segments AB and CD ?

- (A) 15cm (B) 12cm (C) 18cm (D) 6cm (E) 9cm

5 points

18. A circle centered at $(0,0)$ has radius 5. For how many points on the perimeter of the circle are both coordinates integers?

- (A) 5
- (B) 8
- (C) 12
- (D) 16
- (E) 20

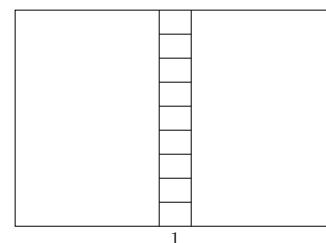


4 points

19. What is the greatest common divisor of $2^{2021} + 2^{2022}$ and $3^{2021} + 3^{2022}$?

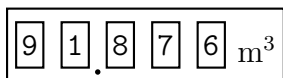
- (A) 2^{2021}
- (B) 1
- (C) 2
- (D) 6
- (E) 12

20. A rectangle is divided into 11 smaller rectangles as shown in the diagram. All these 11 rectangles are similar to the original large rectangle. The orientation of the smallest rectangles is the same as the largest. If the length of the base of the smallest rectangle is 1, what is the perimeter of the large rectangle?



- (A) 20
- (B) 24
- (C) 27
- (D) 30
- (E) 36

21. Looking at the water meter in the bath room Tony notices that all digits are different.



How much water will be used until all digits are different again for the first time?

- (A) 0.006m^3
- (B) 0.034m^3
- (C) 0.086m^3
- (D) 0.137m^3
- (E) 1.048m^3

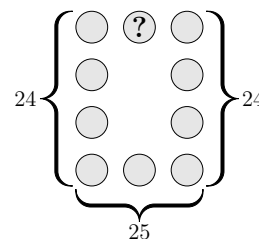
22. Five numbers have a mean of 24. The mean of the three smallest numbers is 19 and the mean of the three largest numbers is 28.

What is the median of the five numbers?

- (A) 20
- (B) 21
- (C) 22
- (D) 23
- (E) 24

5 points

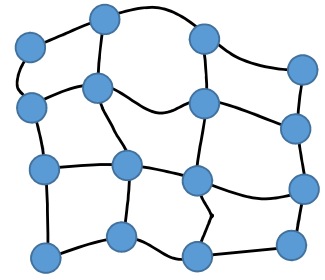
23. The numbers 1 to 10 are placed, once each, in the circles of the figure shown. The sum of the numbers in the left column is 24, the sum of the numbers in the right column is also 24 and the sum of the numbers in the bottom row is 25. Which number is in the circle with the question mark?



- (A) 2
- (B) 4
- (C) 5
- (D) 6
- (E) none of the previous

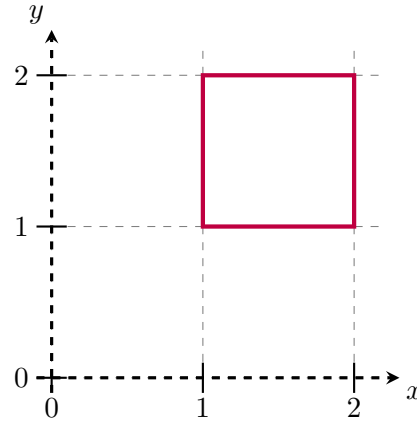
4 points

24. The map shows a region with 16 cities connected by roads. The Government wants to build electricity power plants in some of the cities. Each power plant can provide enough electricity for its own citizens and also for the citizens of neighbouring cities (the ones that are directly connected by a single road). What is the least number of power plants that must be built?



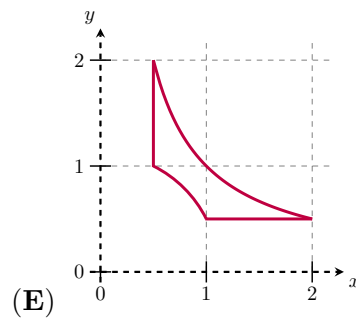
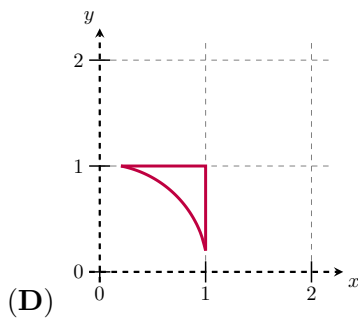
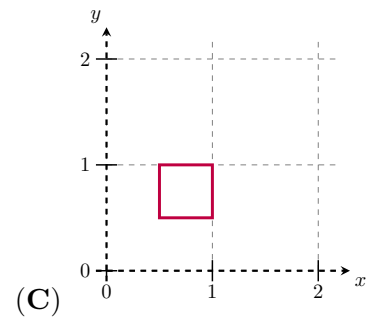
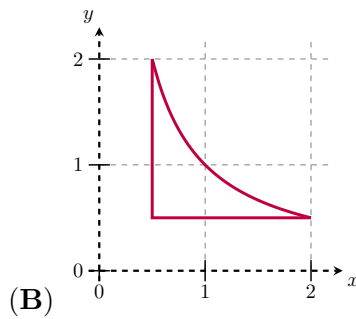
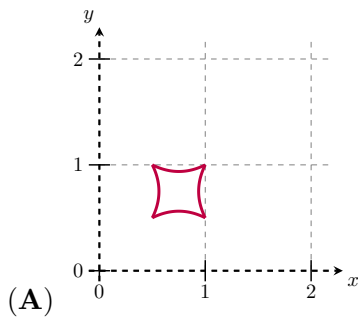
- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

5 points



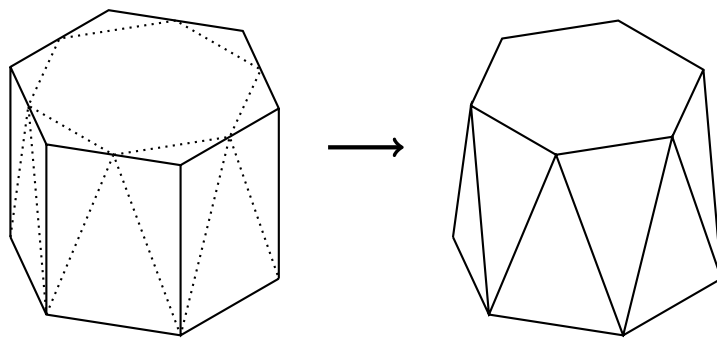
25. A square lies in a coordinate system as shown.

Each point (x, y) on the square is moved to $(\frac{1}{x}, \frac{1}{y})$. What will the resulting figure look like?



26. A regular hexagonal prism has its top corners shaved off, as shown. The top face becomes a smaller regular hexagon and the 6 rectangular faces around the middle become 12 isosceles triangles of two different sizes. What fraction of the original prism's volume has been lost?

- (A) $\frac{1}{12}$ (B) $\frac{1}{6}$ (C) $\frac{1}{4\sqrt{3}}$
 (D) $\frac{1}{6\sqrt{2}}$ (E) $\frac{1}{6\sqrt{3}}$

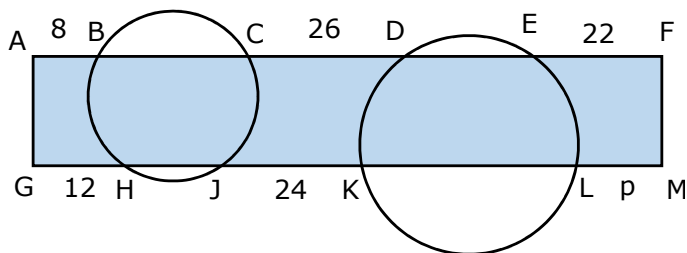


27. A football match between teams from North Berracan and South Berracan is played in a stadium that has a rectangular array of chairs for the spectators. There are 11 North Berracan supporters in each row, 14 South Berracan supporters in each column. This leaves 17 empty seats. What is the smallest possible number of seats in the stadium?

- (A) 500 (B) 660 (C) 690 (D) 840 (E) 994

28. Two circles cut a rectangle AFMG, as shown. The line segments outside the circles have length AB=8, CD=26, EF=22, GH=12 and JK=24. What is the length of LM?

- (A) 14 (B) 15 (C) 16 (D) 17 (E) 18



29. In a sequence, $0 < a_1 < 1$.
 For all $n \geq 1$, $a_{2n} = a_2 \cdot a_n + 1$ and $a_{2n+1} = a_2 \cdot a_n - 2$.
 Given that $a_7 = 2$, what is the value of a_2 ?

- (A) Equal to a_1 (B) 2 (C) 3 (D) 4 (E) 5

30. How many positive 3-digit numbers are there that are equal to 5 times the product of their digits?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

