



Junior: Class (9-10)



3-Point-Problems

1. What is halfway between 2006 and 6002?
 A) 3998 B) 4000 C) 4002 D) 4004 E) 4006

2. How many four-digit numbers (whose four digits are distinct) are divisible by 2006?
 A) 1 B) 2 C) 3 D) 4 E) 5

3. What is the least 10-digit number that can be obtained by putting together the following six numbers one after another: 309, 41, 5, 7, 68, and 2?
 A) 1 234 567 890 B) 1 023 456 789 C) 3 097 568 241
 D) 2 309 415 687 E) 2 309 415 678

4. How many times between 00:00 and 23:59 does an electronic watch show all the four digits 2, 0, 0 and 6 in any order?
 A) 1 B) 2 C) 3 D) 4 E) 5

5. A flag consists of three stripes of equal width, which are divided into two, three and four equal parts, respectively. What fraction of the area of the flag is colored grey?
 A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{5}$ D) $\frac{4}{7}$ E) $\frac{5}{9}$

A diagram of a flag divided into three horizontal stripes of equal width. The top stripe is white, the middle is grey, and the bottom is white. The grey stripe is divided into two equal parts by a vertical line. The bottom white stripe is divided into three equal parts by two vertical lines. An arrow points upwards from the top of the flag.

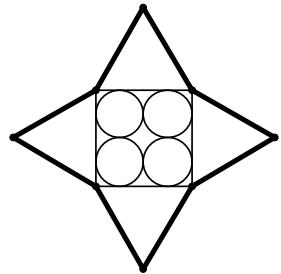
6. My Grandma's watch gains one minute every hour. My Grandpa's watch loses half a minute every hour. When I left their house I synchronized their watches and told them I would return when the difference between the times on their watches is exactly one hour. How long will it be before I return?
 A) 12 hours B) 14 hours and a half C) 40 hours
 D) 60 hours E) 90 hours

7. Ali says that 25% of his books are novels, and $\frac{1}{9}$ of them are poetry. Given that he has between 50 and 100 books, how many books does he have?
 A) 50 B) 56 C) 64 D) 72 E) 93

8. One packet of Chocofruit candies costs 10 Rs. There is a coupon inside every packet. For 3 coupons you get another packet of Chocofruit candies. How many packets of Chocofruit candies can you get for 150 Rs?
 A) 15 B) 17 C) 20 D) 21 E) 22

9. The numbers a , b , c , d and e are positive, such that $ab = 2$, $bc = 3$, $cd = 4$, $de = 5$. What is the value of $\frac{e}{a}$?
- A) $15/8$ B) $5/6$ C) $3/2$ D) $4/5$
 E) impossible to determine

10. What is the perimeter of the star if you know that the star on the picture is formed by four equal circles with radius 5 cm, one square and four equilateral triangles?
- A) 40 cm B) 80 cm C) 120 cm D) 160 cm E) 240 cm

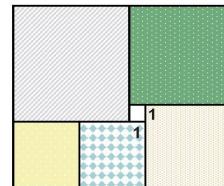


4-Point-Problems

11. The last digit of a three-digit number is 2. If we move the last digit to the front, the number is reduced by 36. What is the sum of digits of the original number?
- A) 4 B) 10 C) 7 D) 9 E) 5

12. Ahmad asked Sara how old she is. Sara replied: "If I live to be one hundred, then my age is four thirds of half of my remaining time." How old is Sara?
- A) 20 B) 40 C) 50 D) 60 E) 80

13. The rectangle in the figure is divided into six squares. The length of the side of the smallest square is 1 cm. What is the length of the sides of the largest square?
- A) 4 cm B) 5 cm C) 6 cm D) 7 cm E) 8 cm



14. In the pattern shown each letter represents a different digit, and each digit a different letter. What digit does G represent?
- A) 1 B) 2 C) 3 D) 4 E) 5

$$\begin{array}{r}
 \text{K A N} \\
 + \text{K A G} \\
 \hline
 \text{+ K N G} \\
 \hline
 \text{2 0 0 6}
 \end{array}$$

15. While Raza is solving one of the "Kangaroo" problems he makes the following correct conclusions:

- 1) If answer A is true, then answer B is also true.
- 2) If answer C is not true, then answer B is also not true.
- 3) If answer B is not true, then neither D nor E is true.

Which of the answers to the problem is true? (Recall that for any Kangaroo problem exactly one answer is true.)

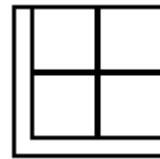
- A) answer A B) answer B C) answer C D) answer D E) answer E

16. What is the maximum number of digits that a number could have if every pair of consecutive digits is a perfect square?

- A) 5 B) 4 C) 3 D) 6 E) 10

17. A square of area 125 cm^2 was divided into five parts— four squares and one L-shaped figure – each having equal area as shown in the figure. Find the length of the shortest side of the L-shaped figure.

- A) 1 cm B) 1.2 cm C) $2(\sqrt{5}-2) \text{ cm}$
 D) $3(\sqrt{5}-1) \text{ cm}$ E) $5(\sqrt{5}-2) \text{ cm}$



18. If the sum of three positive numbers is equal to 20, then the product of the two largest numbers among them is always

- A) greater than 99 B) greater than 0.001
 C) different from 25 D) different from 75
 E) different from 100

19. A magic island is inhabited by knights (who always tell the truth) and liars (who always lie). A wise man met two people X and Y from the island and decided to determine if they were knights or liars. When he asked X, “Are you both knights?” he could not be sure of their identities. When he asked X, “Are you of the same type?” he could then identify them. What were they?

- A) both liars B) both knights C) X – knight, Y – liar
 D) Y – knight, X – liar E) impossible to specify

20. Two identical equilateral triangles with perimeters 18 cm are overlapped with their respective sides parallel. What is the perimeter of the resulting hexagon?

- A) 11 cm B) 12 cm C) 13 cm D) 14 cm E) 15 cm



5-Point-Problems

21. What is the first digit of the smallest natural number that has the sum of its digits equal to 2006?

- A) 1 B) 3 C) 5 D) 6 E) 8

22. Ahmad rides a bicycle from point M to point N with a constant speed. If he increases his speed by 3 m/s, he will arrive to N 3 times faster. How many times faster will Ahmad arrive to N, if he increases his speed by 6 m/s?

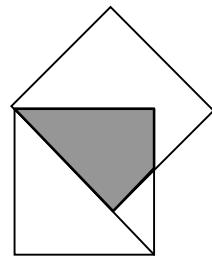
- A) 4 B) 5 C) 6 D) 4.5 E) 8

23. A train consists of five wagons: I, II, III, IV and V. How many ways can the wagons be arranged so that wagon I is nearer to the locomotive than wagon II is?

- A) 120 B) 60 C) 48 D) 30 E) 10

- 24.** Two squares with side 1 have a common vertex, and the edge of one of them lies along the diagonal of the other. What is the area of the shaded region?

- A) $\sqrt{2} - 1$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{2} + 1}{2}$
 D) $\sqrt{2} + 1$ E) $\sqrt{3} - \sqrt{2}$



- 25.** Four little girlfriends stay in a queue for ice creams. Every 10 seconds a queue decreases on 1 person. Due to tedious staying they begin to change the order: girl who occupies the first place go to the last place after a minute of staying.

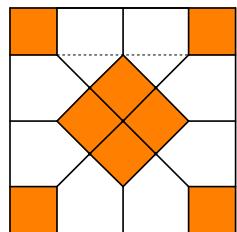
Amna is a first.

How long she will wait for an ice cream if at the moment there are 60 girls before her.

- A) after 10 minutes B) after 10 minutes and 10 seconds
 C) after 10 minutes and 20 seconds D) after 10 minutes and 30 seconds E) none of this

- 26.** The big square is divided by cuts as shown in figure. Dashed line shows that vertices of colored small squares lay on straight line. All colored small squares have same area. The side of a small square is equal to 1. Find the side of an outer square.

- A) $2\sqrt{2}$ B) 4 C) $2\sqrt{2} + 2$ D) $2\sqrt{2} + 4$
 E) none of this



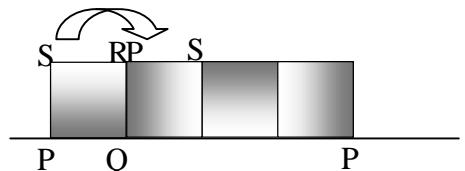
- 27.** Aslam's family consists of father, mother, and some children. The mean age of the family is 18 years. Without the 38-year-old father the mean age of the family decreases to only 14 years. How many children are there in the Dobson family?

- A) 2 B) 3 C) 4 D) 5 E) 6

- 28.** The numbers 1, 2, 3 are written on the circumference of a circle. Then the sum of each pair of neighbouring numbers is written between them, so 6 numbers are obtained (1, 3, 2, 5, 3 and 4). This operation is repeated 4 more times, resulting in 96 numbers on the circle. What is the sum of these numbers?

- A) 486 B) 2187 C) 1458 D) 4374 E) 998.

- 29.** A square PQRS with sides of length 10 cm is rolled without slipping along a line. Initially P and Q are on the line and the first roll is around point Q as shown in the diagram. The rolling stops when P first returns to the line. What is the length of the curve that P has travelled?



- A) 10π B) $5\pi + 5\pi\sqrt{2}$
 C) $10\pi + 5\pi\sqrt{2}$ D) $5\pi + 10\pi\sqrt{2}$ E) $10\pi + 10\pi\sqrt{2}$

- 30.** Each face of a cube is colored with a different color from a selection of six colors. How many different cubes can be made in this way?

- A) 24 B) 30 C) 36 D) 42 E) 48