Cadet

3-Point-Problems

1. C 3.34 There are eight kangaroos in the cells of the table (see the figure on the right). Find the least number of the kangaroos which have to jump into another cell so that exactly two kangaroos remain in any row and in any column of the table.

   (**A**) 0   (<u>**B**</u>) 1   (**C**) 2   (**D**) 3   (**E**) 4

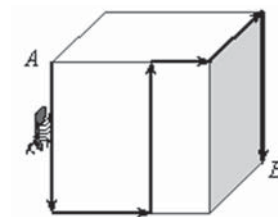**2. B 3.12** How many hours are there in half of a third of a quarter of a day?

   (**A**) $\dfrac{1}{3}$ (**B**) $\dfrac{1}{2}$ (<u>**C**</u>) 1   (**D**) 2   (**E**) 3

3. C 3.40 We have a cube with edge 12 cm. The ant moves on the cube surface from point A to point B along the trajectory shown in the figure. Find the length of ant's path.

   (**A**) 40 cm   (**B**) 48 cm   (**C**) 50 cm
   (<u>**D**</u>) 60 cm   (**E**) it is impossible to determine

4. B 3.14 Two girls and three boys ate 16 helpings of ice-cream together. Each boy ate twice as much as each girl. How many helpings will be eaten by three girls and two boys with the same passion for ice-cream?

   (**A**) 12   (**B**) 13   (<u>**C**</u>) 14   (**D**) 16   (**E**) 17

5. C 5.1 At Sobieski School, 50% of the students have bikes. Of the students who have bikes, 30% have rollerblades. What percent of students of Sobieski School have both a bike and rollerblades?

   (<u>**A**</u>) 15   (**B**) 20   (**C**) 25   (**D**) 40   (**E**) 80

6. C 3.13 In triangle ABC, the angle at A is three times the size of that at B and half the size of the angle at C. What is the angle at A?

   (**A**) 30°   (**B**) 36°   (<u>**C**</u>) 54°   (**D**) 60°   (**E**) 72°

7. C 3.30 The diagram shows the ground plan of a room. The adjacent walls are perpendicular to each other. Letters a, b represent the dimensions (lengths) of the room. What is the area of the room?

(**A**) $2ab + a(b - a)$ (**B**) $3a(a + b) - a^2$ (**C**) $3a^2b$

(**D**) $3a(b - a) + a^2$ (**E**) $3ab$
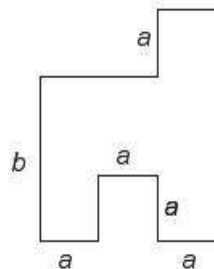
8. B 3.25 Jane cut a sheet of paper to 10 pieces. Then she took one piece and cut it again to 10 pieces. She went on cutting in the same way three more times. How many pieces of paper did she have after the last cutting?

(**A**) 36   (**B**) 40   (**C**) 46   (**D**) 50   (**E**) 56

9. A number of crows is sitting on a number of poles in the back of the garden, one crow on each pole. For one crow there is unfortunately no pole. Sometime later the same crows are sitting in pairs on the poles. Now there is one pole without a crow. How many poles are there in the back of the garden?

(**A**) 2   (**B**) 3   (**C**) 4   (**D**) 5   (**E**) 6

10. To the series of letters AGKNORU (in alphabetical order) is associated a series of different digits, placed in increasing order. What is the biggest number one can associate to the word KANGOUROU

(**A**) 987654321   (**B**) 987654354   (**C**) 436479879

(**D**) 536479879   (**E**) 597354354

4-Point-Problems

11. C NP.49 Consider a dart board as shown on the figure. The score is inversely proportional to the area of the region. If a hit into region B is worth 10 points, then a hit into region C is worth:

(**A**) 5 points   (**B**) 8 points   (**C**) 16 points

(**D**) 20 points   (**E**) 24 points
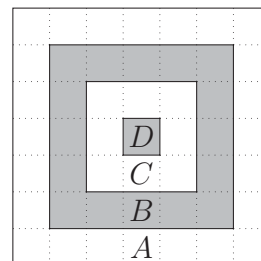
12. C 4.57 A group of classmates is planning a trip. If each of them would make a contribution of 14 euro for the expected travel expenses, they would be 4 euro short. But if each of them would make a contribution of 16 euro, they would have 6 euro more than they need. How much should each of the classmates contribute so that they collect exactly the amount needed for the trip?

(**A**) 14,40 euro   (**B**) 14,60 euro   (**C̲**) 14,80 euro

(**D**) 15,00 euro   (**E**) 15,20 euro

13. C 3.57 In the diagram, the five circles have the same radii and touch as shown. The small square joins the centres of the four outer circles. The ratio of the area of the shaded part of all five circles to the area of the unshaded parts of all five circles is
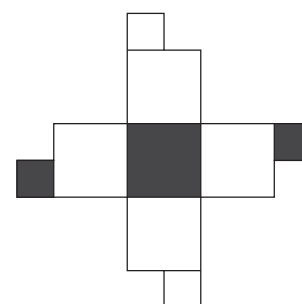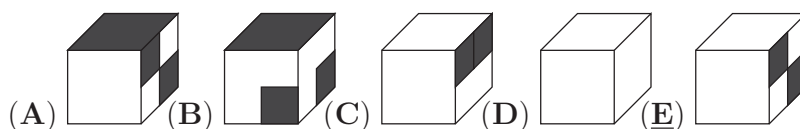
(**A**) $1:3$ (**B**) $1:4$ (**C**) $2:5$ (**D̲**) $2:3$ (**E**) $5:4$
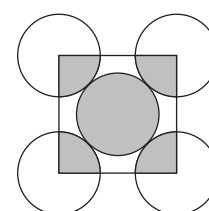
14. C 4.31 The watchman works 4 days a week and has a rest on the fifth day. He had been resting on Sunday and began working on Monday. After how many days will his rest fall on Sunday?

(**A**) 30   (**B**) 36   (**C**) 12   (**D̲**) 34   (**E**) 7

15. C 3.50 Which of the following cubes has been folded from the plan on the right?

(**A**)   (**B**)   (**C**)   (**D**)   (**E̲**)

16. C 4.40 From noon till midnight Clever Cat is sleeping under the oak tree, and from midnight till noon he is telling stories. There is a poster on the oak tree saying: "Two hours ago Clever Cat was doing the same that he will be doing in an hour." How many hours a day the poster tells truth?

(**A**) 6   (**B**) 12   (**C̲**) 18   (**D**) 3   (**E**) 21

17. C 4.18 The diagram shows an equilateral triangle and a regular pentagon. What, in degrees, is the size of the angle marked x?
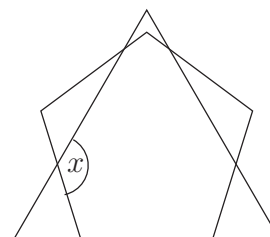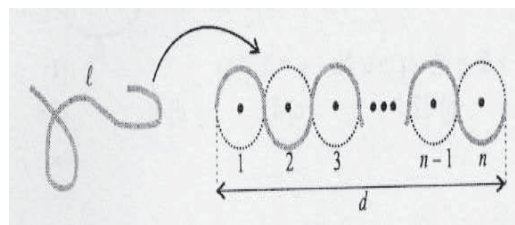
(**A**) 124   (**B**) 128   (**C**) 132   (**D**) 136   (**E**) 140

18. C 3.33 Mike chooses a three-digit number and a two-digit number. Find the sum of these numbers if their difference equals 989.

(**A**) 1000   (**B**) 1001   (**C**) 1009   (**D**) 1010   (**E**) 2005

19. C RO.20 $l = ?$

(**A**) dn (**B**) πdn (**C**) $2\pi dn$ (**D**) $\frac{\pi}{2}d$ (**E**) πd

20. C 4.39 For a natural number n, by its length we mean the number of factors in the representation of n as a product of prime numbers. For example, the length of the number $90 = 2 \cdot 3 \cdot 3 \cdot 5$ is equal to 4. How many odd numbers less than 100 have length 3?

(**A**) 2   (**B**) 3   (**C**) 5
(**D**) 7   (**E**) another answer

5-Point-Problems

21. C 5.25 Two rectangles $ABCD$ and $DBEF$ are shown in the figure. What is the area of the rectangle $DBEF$?

(**A**) 10 cm^2 (**B**) 12 cm^2 (**C**) 13 cm^2
(**D**) 14 cm^2 (**E**) 16 cm^2
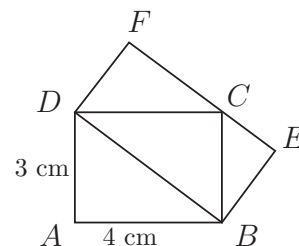
22. C 3.20 Peter has a three-digit code lock. He has forgotten the code but he knows that all three digits are different, and that the first digit is equal to the square of the ratio of second and third digits. How many three-digit codes have this property
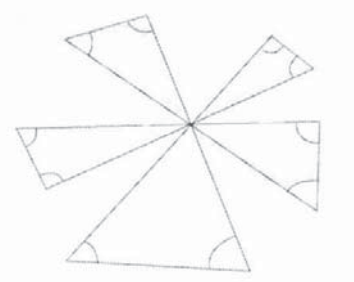
(**A**) 1   (**B**) 2   (**C**) 3   (**D**) 4   (**E**) 8

23. C 4.13 How many two-digit numbers are there which are more than trebled when their digits are reversed?

(**A**) 6   (**B**) 10   (**C**) 15   (**D**) 22   (**E**) 33

24. C 4.14 How many degrees are the sum of the 10 angles which you can see in the picture

(**A**) 300°   (**B**) 450°   (**C**) 360°   (**D**) 600°   (**E**) 720°

25. C 5.47 There are 64 litres of wine in a barrel. Replace 16 litres of wine with 16 litres of water: suppose that wine and water mix uniformly and that the volume of the mixture is the sum of the two volumes. Now replace 16 litres of the mixture with 16 litres of water: wait until they mix and do the same one more time. Finally, how many litres of wine (of course mixed with water) remain in the barrel?

(**A**) 27   (**B**) 24   (**C**) 16   (**D**) 30   (**E**) 48

26. C 5.35 Let a and b be tow shorter sides of the right-angled triangle. If d is the diameter of incircle and D is the diameter of circumcircle of this triangle, then $d + D$ is equal to

(**A**) $a + b$ (**B**) $2(a + b)$ (**C**) $0,5(a + b)$
(**D**) $\sqrt{ab}$ (**E**) $\sqrt{a^2 + b^2}$
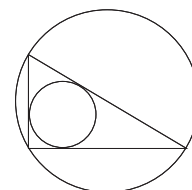
27. C 4.11 The average of 10 different positive integers is 10. How much can be the biggest one among the 10 numbers at most?

(**A**) 10   (**B**) 45   (**C**) 50   (**D**) 55   (**E**) 91

28.   C 4.95 A particle moves through the first quadrant of the shown figure as follows. During the first minute it moves from the origin to (1;0). Thereafter it continues to follow the directions indicated in the figure, going back and forth between the positive part of the x and y axes, moving one unit of distance parallel to an axis in each minute. Which point will the particle reach after exactly 2 hours?
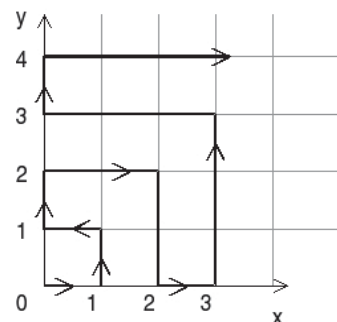
(**A**) (10; 0) (**B**) (1; 11) (**C**) (10; 11) (**D**) (2; 10) (**E**) (11; 11)

29.   C 5.49 Charles says the truth every other day, otherwise he lies. Today he stated exactly four of the following sentences. Which one he couldn't have stated today?

(**A**) I have a prime number of friends.

(**B**) I have as many male friends as female.

(**C**) 288 is divisible by 12.

(**D**) I always say the truth.

(**E**) Three of my friends are older than me.

30.   C 5.9 How many sets of consecutive positive integers with minimum 2 elements are there, in which the sum of the elements is equal to 100?

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