Questions of Kangaroo 2005

MINOR (grades 3 and 4)

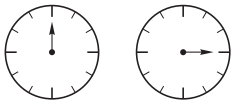
3-POINT QUESTIONS

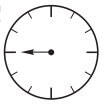
M1. A butterfly sat down on a correctly solved exercise. What number is the butterfly covering?

$2005 - 205 = 1300 +$ 

A 250 **B** 400 **C** 500 **D** 910 **E** 1800

M2. At noon the minute hand of a clock is in the position shown on the left and after the quarter of an hour – in the position shown on the right. Which position the minute hand will take after seventeen quarters from the noon?



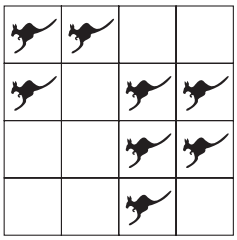
A  **B**  **C**  **D**  **E** 

M3. Erika bought cookies, each of them costs 3 euros. She gave 10 euros and obtained 1 euro of the change. How many cookies did Erika buy?

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

M4. In the diagram every of the eight kangaroos can jump to any empty square. What is the least number of kangaroos that must jump so that each row and each column have exactly two kangaroos?

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

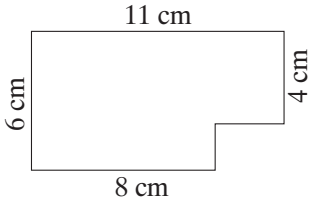


M5. Helga lives in her home with father, mother, brother and also one dog, two cats, two parrots and four goldfishes. How many legs do they have altogether?

A 22 **B** 40 **C** 28 **D** 32 **E** 24

M6. John has a chocolate tablet consisting of square pieces of $1\,\text{cm} \times 1\,\text{cm}$. He has eaten already some pieces in a corner (see the picture). How many pieces John still have?

A 66 **B** 64 **C** 62 **D** 60 **E** 58



M7. Daniel wants to fill a tank for his turtle with 4 buckets of water. At each trip he fills one bucket from a faucet but when walking to the tank he spills one half of the water. How many trips from the faucet to the tank does he have to do?

A 4 **B** 5 **C** 6 **D** 7 **E** 8

M8. What is the smallest possible number of children in a family if each child has at least one brother and one sister?

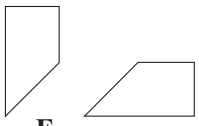
A 2 **B** 3 **C** 4 **D** 5 **E** 6

4-POINT QUESTIONS

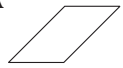
M9. After the first whistle of the trainer the monkeys in the circus formed 6 rows. In every row there were 4 monkeys. After the second whistle they have rearranged themselves into 8 rows. How many monkeys were in every row after the second whistle?
A 1 **B** 2 **C** 3 **D** 4 **E** 6

M10. Among the five numbers below, the one I chose is even. All its digits are different. The hundreds' digit is double the units' digit, the tens' digit is higher than the thousands' digit. Which one did I choose?
A 1246 **B** 3874 **C** 4683 **D** 4874 **E** 8462

M11. A square piece of paper has been cut in three pieces. Two of them are in the picture on the right. What is the third one?



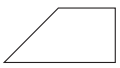
A



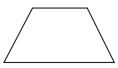
B

C

D



E



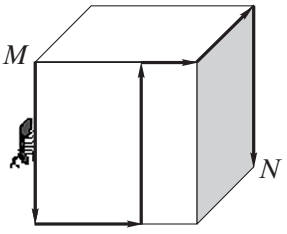
M12. There were 9 pieces of paper. Some of them got cut into three parts. Altogether, there became 15 pieces of paper. How many pieces were cut into parts?
A 1 **B** 2 **C** 3 **D** 4 **E** 5

M13. Jim counts 24 euros in his pockets and John 66 euros. Jack has exactly so much more money as John has more than Jack. How much euros has Jack?
A 33 **B** 35 **C** 42 **D** 45 **E** 48

M14. A frame of a rectangular picture is made from planks of equal width. What is the width of these planks (in centimetres) if the outside perimeter of the frame is 8 cm more than the inside perimeter?
A 1 **B** 2 **C** 4 **D** 8
E It depends on the dimensions of the picture

M15. In a trunk there are 5 chests, in each chest there are 3 boxes, and in each box there are 10 gold coins. The trunk, the chests, and the boxes are locked. How many locks must be opened in order to get 50 coins?
A 5 **B** 6 **C** 7 **D** 8 **E** 9

M16. The diagram shows a cube with sides of length 12 cm. An ant moves on the cube surface from point M to point N following the route shown. Find the length of ant's path.
A 60 cm **B** 50 cm **C** 48 cm **D** 40 cm
E It is impossible to determine



5-POINT QUESTIONS

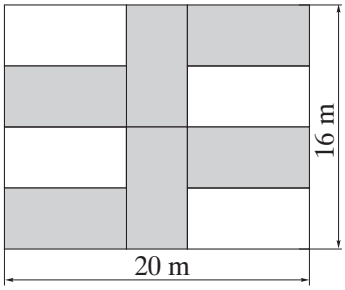
M17. The lift can not carry more than 150 kg. Four friends weigh: 60 kg, 80 kg, 80 kg and 80 kg. At least how many runs of the lift are necessary to carry the four friends to the highest floor?
A 1 **B** 2 **C** 3 **D** 4 **E** 7

M18. You can make only one rectangle with the perimeter consisting of 6 matches (see the picture). How many different rectangles with the perimeter consisting of 14 matches can you compose?
A 2 **B** 3 **C** 4 **D** 6 **E** 12

M19. Each of seven boy paid exactly the same amount of money for the excursion. The total sum of the money they paid is a three-digital number 3∗0. What is the digit in the middle?
A 3 **B** 4 **C** 5 **D** 6 **E** 7

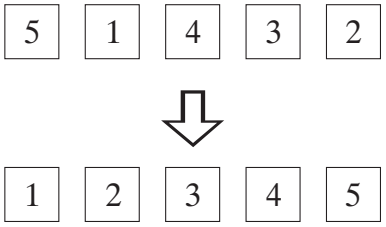
M20. Two traffic signs mark the bridge in my village. These marks indicate the maximum width and the maximum possible weight. Which one of the following trucks is allowed to cross that bridge?
A The one 315 cm wide and weighing 4307 kg
B The one 330 cm wide and weighing 4250 kg
C The one 325 cm wide and weighing 4400 kg
D The one 322 cm wide and weighing 4298 kg
E No one of these

M21. The figure shows a rectangular garden with dimensions 16 m and 20 m. The gardener has planted six identical flowerbeds (they are gray in the diagram). What is the perimeter (in metres) of each of the flowerbeds?
A 20 **B** 22 **C** 24 **D** 26 **E** 28

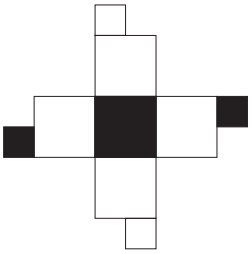


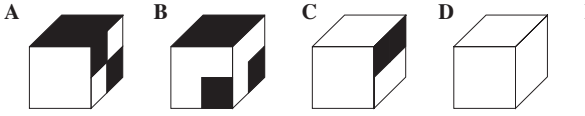
M22. Mike has chosen a three-digit number and a two-digit number. Find the sum of these numbers if their difference equals 989.
A 1000 **B** 1001 **C** 1009 **D** 1010 **E** 2005

M23. Five cards are lying on the table in the order 5, 1, 4, 3, 2. You must get the cards in the order 1, 2, 3, 4, 5. Per move, any two cards may be interchanged. How many moves do you need at least?
A 2 **B** 3 **C** 4 **D** 5 **E** 6



M24. Which of the following cubes has been folded out of the plan on the right?





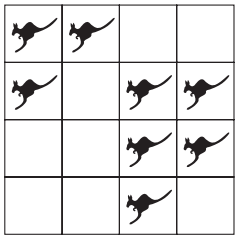
BENJAMIN (grades 5 and 6)

3-POINT QUESTIONS

B1. What is $2005 \times 100 + 2005$?
A 2005002005 **B** 20052005 **C** 2007005 **D** 202505 **E** 22055

B2. Ann and Betty have 10 sweets, but Betty has 2 more than Ann. How many sweets does Betty have?
A 8 **B** 7 **C** 6 **D** 5 **E** 4

B3. In the diagram every of the eight kangaroos can jump to any empty square. What is the least number of kangaroos that must jump so that each row and each column have exactly two kangaroos?
A 0 **B** 1 **C** 2 **D** 3 **E** 4



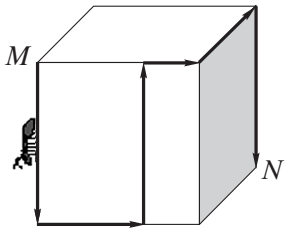
B4. Helga lives with her father, mother, brother and also one dog, two cats, two parrots and four goldfishes. How many legs do they have altogether?
A 22 **B** 28 **C** 24 **D** 32 **E** 13

B5. A butterfly sat down on my correctly solved exercise:

$2005 - 205 = 25 +$ 

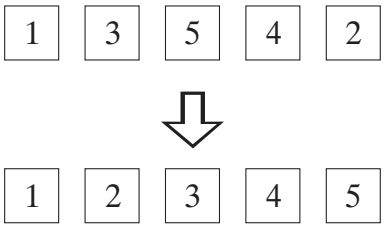
What number is the butterfly covering?
A 250 **B** 1825 **C** 2185 **D** 1775 **E** 1800

B6. The diagram shows a cube with sides of length 12 cm. An ant moves on the cube surface from point M to point N following the route shown. Find the length of ant's path.
A 40 cm **B** 48 cm **C** 50 cm **D** 60 cm
E It is impossible to determine



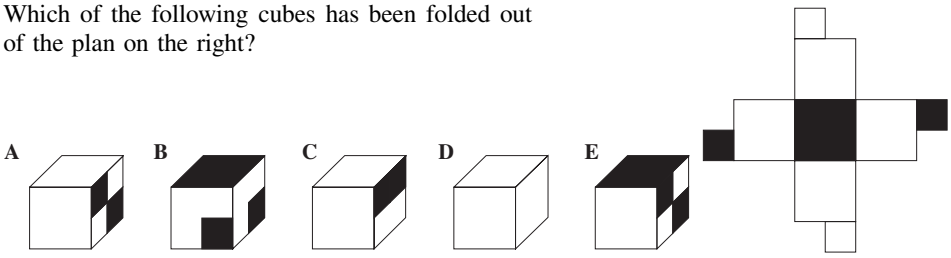
B7. Jane cut a sheet of paper into 10 pieces. Then she took one of the pieces and cut it into 10 pieces also. She repeated this twice more. How many pieces of paper did she have in the end?
A 30 **B** 27 **C** 47 **D** 40 **E** 37

B8. Five cards are lying on the table in the order 1, 3, 5, 4, 2. You must get the cards in the order 1, 2, 3, 4, 5. Per move, any two cards may be interchanged. How many moves do you need at least?
A 2 **B** 1 **C** 4 **D** 3 **E** 5



B9. Vesna chose a whole number and multiplied it by 3. Which of the following numbers could not be her answer?
A 103 **B** 105 **C** 204 **D** 444 **E** 987

B10. Which of the following cubes has been folded out of the plan on the right?

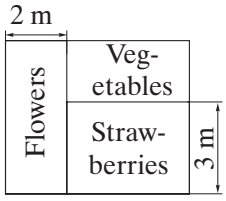


4-POINT QUESTIONS

B11. How many two-digit numbers have different odd digits?
A 15 **B** 20 **C** 25 **D** 30 **E** 50

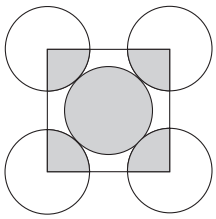
B12. Mowgli needs 40 minutes to walk from home to the sea by foot and to return home on an elephant. When he rides both ways on an elephant, the journey takes 32 minutes. How long would the journey last, if he would walk both directions?
A 24 minutes **B** 42 minutes **C** 46 minutes **D** 48 minutes **E** 50 minutes

B13. In the diagram you see the rectangular garden of Green's family. It has an area of $30\,\text{m}^2$ and is divided into three rectangular parts. One side of the part where flowers are growing has a length of 2 m. Its area is $10\,\text{m}^2$. The part with strawberries has one side of length 3 m. What is the area of the part where vegetables are growing?
A $4\,\text{m}^2$ **B** $6\,\text{m}^2$ **C** $8\,\text{m}^2$ **D** $10\,\text{m}^2$ **E** $12\,\text{m}^2$



B14. How many hours are there in half the third of the quarter of a day?
A 1 **B** 2 **C** 3 **D** $\frac{1}{3}$ **E** $\frac{1}{2}$

B15. In the diagram, the five circles have the same radii and touch as shown. The 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 the circles is:
A 1:3 **B** 2:3 **C** 2:5 **D** 1:4 **E** 5:4

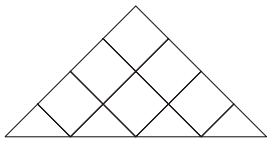


B16. If the sum of five consecutive positive integers is 2005, then the largest of these numbers is:
A 401 **B** 403 **C** 404 **D** 405 **E** 2001

B17. How many different factors (including 1 and 100) does 100 have?
A 3 **B** 6 **C** 7 **D** 8 **E** 9

B18. A frame of a rectangular picture is made from planks of equal width. What is the width of these planks (in centimetres) if the outside perimeter of the frame is 8 cm more than the inside perimeter?
A It depends on the dimensions of the picture
B 8 **C** 4 **D** 2 **E** 1

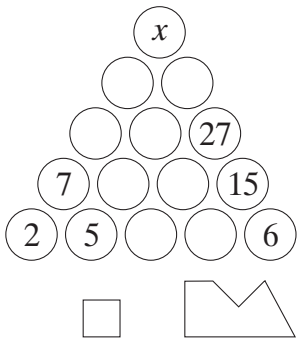
B19. There are seven squares in the picture. How many more triangles than squares are there in the picture?
A 1 **B** 2 **C** 3 **D** 4 **E** 0



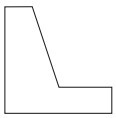
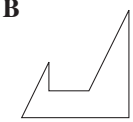
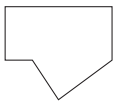
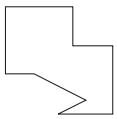
B20. In a trunk there are 5 chests, in each chest there are 3 boxes, and in each box there are 10 gold coins. The trunk, the chests, and the boxes are locked. How many locks must be opened in order to get 50 coins?
A 6 **B** 5 **C** 7 **D** 9 **E** 8

5-POINT QUESTIONS

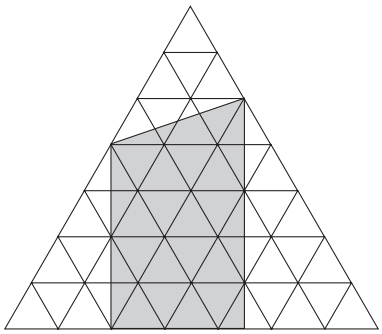
B21. You fill the diagram with integers so that every number (except those from the lower row) is equal to the sum of two neighbouring numbers below it. Which number should replace x?
A 32 **B** 50 **C** 55 **D** 82 **E** 100



B22. A square piece of paper has been cut in three pieces. Two of them are in the picture on the right. What is the third one?

A  **B**  **C**  **D**  **E** 

B23. In the picture the small equilateral triangles have an area of 1 unit. What is the area of the shaded region?
A 20 **B** 22.5 **C** 23.5 **D** 25 **E** 32

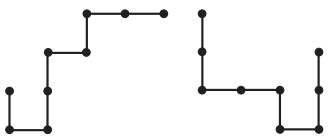


B24. Peter has a three-digit code lock. He has forgotten the code but he knows that all three digits are different, and that the first digit is equal to the square of the quotient of the second and third digit. How many combinations will Peter have to try in order to crack the code?
A 8 **B** 4 **C** 3 **D** 2 **E** 1

B25. What is $1+2-3-4+5+6-7-8+\cdots+2001+2002-2003-2004+2005$?
A 0 **B** 2005 **C** 1 **D** 2004 **E** -4

B26. From noon till midnight Clever Cat is sleeping under the oak tree, and from midnight till noon he is awake telling stories. There is a poster on the oak tree saying: "Two hours ago Clever Cat was doing the same as he will be doing after an hour sharp." How many hours a day the poster tells truth?
A 6 **B** 12 **C** 18 **D** 3 **E** 21

B27. Each of these two pieces of wire is made of 8 segments of length 1. One of the pieces is placed one above the other so that they coincide partially. What is the largest possible length of their common part?
A 6 **B** 5 **C** 4 **D** 3 **E** 2



B28. 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** 597354354 **E** 536479879

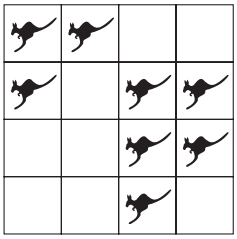
B29. The lift can not carry more than 150 kg. Four friends weigh: 50 kg, 75 kg, 80 kg and 85 kg. At least how many runs of the lift are necessary to carry the four friends to the highest floor?
A 1 **B** 2 **C** 7 **D** 4 **E** 3

B30. Molly, Dolly, Sally, Elly and Kelly are sitting on a park bench. Molly is not sitting on the far right and Dolly is not sitting on the far left. Sally is not sitting at either end. Kelly is not sitting next to Sally and Sally is not sitting next to Dolly. Elly is sitting to the right of Dolly, but not necessarily next to her. Who is sitting at the far right end?
A Cannot be determined **B** Dolly **C** Sally **D** Elly **E** Kelly

CADET (grades 7 and 8)

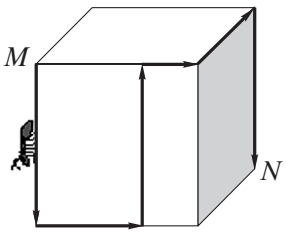
3-POINT QUESTIONS

C1. In the diagram every of the eight kangaroos can jump to any empty square. What is the least number of kangaroos that must jump so that each row and each column have exactly two kangaroos?
A 0 **B** 1 **C** 2 **D** 3 **E** 4



C2. How many hours are there in half the third of the quarter of a day?
A $\frac{1}{3}$ **B** $\frac{1}{2}$ **C** 1 **D** 2 **E** 3

C3. The diagram shows a cube with sides of length 12 cm. An ant moves on the cube surface from point M to point N following the route shown. Find the length of ant's path.
A It is impossible to determine
B 40 cm **C** 48 cm **D** 50 cm **E** 60 cm

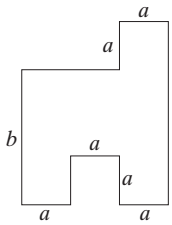


C4. Two girls and three boys ate 16 helpings of ice-cream together. Each boy ate twice as much as each girl. How many helpings will be eaten by three girls and two boys with the same passion for ice-cream?
A 12 **B** 13 **C** 14 **D** 16 **E** 17

C5. 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?
A 15% **B** 20% **C** 25% **D** 40% **E** 80%

C6. 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° **C** 54° **D** 60° **E** 72°

C7. The diagram shows the ground plan of a room. The adjacent walls are perpendicular to each other. 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** $3ab$



C8. 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 46 **B** 50 **C** 36 **D** 40 **E** 56

C9. 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

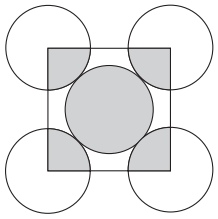
C10. To the series of letters AGKNORU (in alphabetical order) is associated a series of different digits, placed in increasing order. What is the biggest number one can associate to the word KANGOUROU?
A 987654321 **B** 987654354 **C** 436479879 **D** 536479879 **E** 597354354

4-POINT QUESTIONS

C11. What is $2005 \cdot 5002$?
A 1291 **B** 102910 **C** 10029010 **D** 1000290010 **E** 100002900010

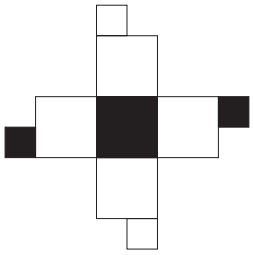
C12. A group of classmates is planning a trip. If each of them would make a contribution of 14 euro for the expected travel expenses, they would be 4 euro short. But if each of them would make a contribution of 16 euro, they would have 6 euro more than they need. How much should each of the classmates contribute so that they collect exactly the amount needed for the trip?
A 14,40 euro **B** 14,60 euro **C** 14,80 euro **D** 15,00 euro **E** 15,20 euro

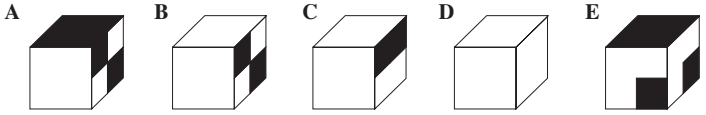
C13. In the diagram, the five circles have the same radii and touch as shown. The square joins the centres of the four outer circles. The ratio of the area of the shaded part of all five circles to the area of the unshaded parts of the circles is:
A 1:3 **B** 1:4 **C** 2:5 **D** 2:3 **E** 5:4



C14. 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 **D** 34 **E** 7

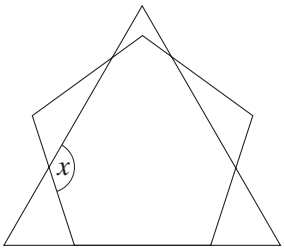
C15. Which of the following cubes has been folded out of the plan on the right?





C16. 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 as he will be doing after an hour sharp." How many hours a day the poster tells truth?
A 6 **B** 12 **C** 18 **D** 3 **E** 21

C17. The diagram shows an equilateral triangle and a regular pentagon. What is the size of the angle marked x?
A 124° **B** 128° **C** 132° **D** 136° **E** 140°



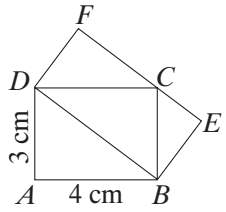
C18. Mike has chosen a three-digit number and a two-digit number. Find the sum of these numbers if their difference equals 989.
A 1001 **B** 1010 **C** 2005 **D** 1000 **E** 1009

C19. What is $1+2-3-4+5+6-7-8+\cdots+2001+2002-2003-2004+2005$?
A 0 **B** 2005 **C** 2004 **D** 1 **E** -4

C20. For a positive integer 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 QUESTIONS

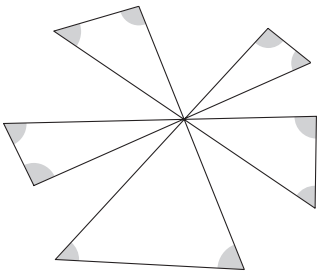
C21. Two rectangles $ABCD$ and $DBEF$ are shown in the figure. What is the area (in cm^2) of the rectangle $DBEF$?
A 10 **B** 12 **C** 13 **D** 14 **E** 16



C22. 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 quotient of the second and third digit. How many combinations will Peter have to try in order to crack the code?
A 1 **B** 2 **C** 3 **D** 4 **E** 8

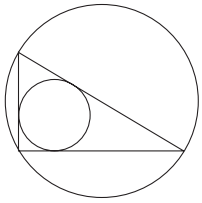
C23. How many two-digit numbers are more than trebled when their digits are reversed?
A 6 **B** 10 **C** 15 **D** 22 **E** 33

C24. 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°



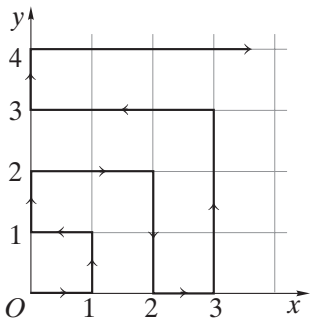
C25. There are 64 litres of birch sap in a barrel. Replace 16 litres of sap with 16 litres of water and mix. Now replace 16 litres of the mixture with 16 litres of water, mix and do the same one more time. Finally, how many litres of sap (of course mixed with water) remain in the barrel?
A 27 **B** 24 **C** 16 **D** 30 **E** 48

C26. Let a and b be two shorter sides of the right-angled triangle. Then the sum of the diameter of the incircle and that of the circumcircle of this triangle is equal to:
A $\sqrt{a^2+b^2}$ **B** $\sqrt{ab}$ **C** $0{,}5(a+b)$ **D** $2(a+b)$ **E** $a+b$



C27. The average of 10 different positive integers is 10. What is the largest possible value that one of these integers could have?
A 91 **B** 55 **C** 50 **D** 45 **E** 10

C28. 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 $(11; 11)$



C29. Every other day Charles always says the truth, 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 Three of my friends are older than me.
D I always say the truth.
E 288 is divisible by 12.

C30. How many 4-digit divisors does the number 102^2 have?
A 2 **B** 3 **C** 4 **D** 5 **E** 6