

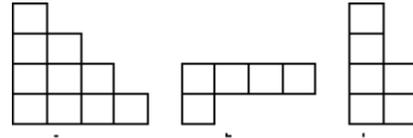
European Kangaroo Mathematics Contest - Friday March 17th 2000

HAVO and VWO - Third, fourth and fifth year

Questions 1 to 10: +3 points for each correct answer, -3/4 points for each incorrect answer

1. In the figure you see three views of the same • building, consisting of wooden cubes. How many cubes were used to construct this • building?

- A) 10 B) 11 C) 12 D) 13 E) 14

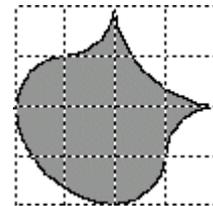


2. Jannie has to make 40 exercises for homework. To stimulate her, her mother promises to give her half a euro for each correctly solved exercise. But each failure will cost 1 euro. She does all exercises, and gets 2 euro from her mother. How many exercises did she solve correctly?

- A) 24 B) 25 C) 26 D) 27 E) 28

3. The squares in this lattices have sides of length 2 cm. The boundary of the grey figure consists of a number of quarter circles. What is its area?

- A) 16 cm² B) 20 cm² C) 24 cm² D) 28 cm² E) 32 cm²

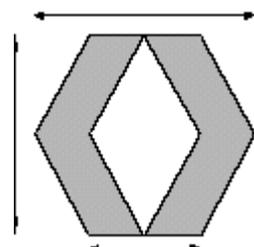


4. In which one of the following cases are you sure to have a triangle that is *isosceles* but *not equilateral*?

- A) an arbitrary triangle
 B) a triangle with an angle of 30° and an angle of 100°
 C) a triangle with three equal sides
 D) a triangle with an angle of 30° and an angle of 60°
 E) a triangle with an angle of 50° and an angle of 80°

5. What is the area of the grey part of the shown figure?

- A) 9 B) 3√2 C) 12 D) 6√3-3√2 E) 18

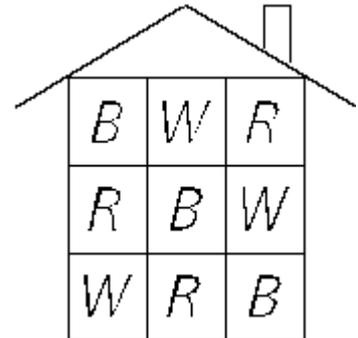


6. Albert, Louis and Victor spend a nice evening watching TV and nibbling chips. Albert bought 5 bags of chips and Louis 2. Victor didn't bring any chips. At the end, all chips are eaten. They decide to divide the costs fairly: each one should pay one third. Victor pays f 1,40 guilders. How many guilders does Albert receive?

- A) f 0,40 B) f 1,00 C) f 1,20 D) f 1,40 E) f 1,60

7. Jan has 9 cubes, three white, three red and three blue. They fit into a puzzle in the form of a house, such that each color occurs in each row and in each column. The figure shows one solution. How many such solutions are there in total?

- A) 4 B) 6 C) 8 D) 10 E) 12



8. Mother bought a rectangular box with rectangular sugar lumps. Marga ate the upper layer, containing 77 lumps. Then she ate all lumps of the rightmost layer, 55 in total.

To finish her meal, she ate all lumps in the front layer.

How many lumps did she leave in the box?

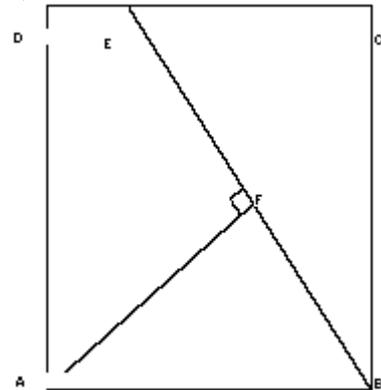
- A) 256 B) 295 C) 300 D) 350 E) 385

9. In square ABCD, line AF is perpendicular to line BE. AF = 4, FB = 3.

What is the length of EC?

- A) 2,75 B) 3,25 C) 3,5 D) 3,75

E) This cannot be calculated.



10. Four cats, Wil, Tom, Bas and Jerry, have been catching mice. Tom and Jerry together caught as many mice as Wil and Bas together. Wil caught more than Bas. Wil and Jerry together caught less than Tom and Bas together. Tom caught 3 mice. How many did Bas catch?

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

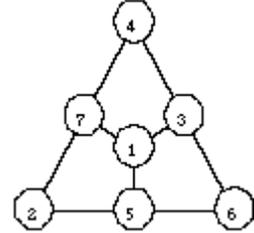
Questions 11 to 20: +4 points for each correct answer, -1 point for each incorrect answer

11. In three years time, Stephen will be three times as old as three years ago. In four years time, Stephen will be times as old as four years ago. What word has to be filled in?

- A) two B) three C) four D) five E) six

12. The numbers 1 through 7 must be put in the circles such that in each quadrangle the sum of the numbers in its four vertices equals 15. The figure shows a solution with 1 in the central circle. There is a solution with a different number in that central circle. What number is that?

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



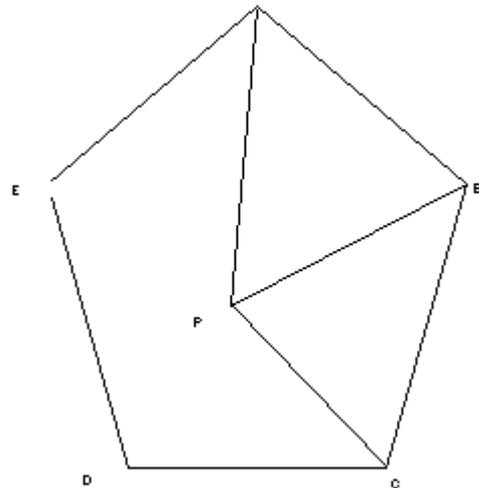
13. The average age of a certain number of persons was exactly equal to their number. Someone who is 29 years old joins the group. As a result, the average age again is equal to the number of persons in the group. How many persons did the original group count?

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

14. In this regular pentagon $ABCDE$ triangle ABP is equilateral.

How large is angle BCP ?

- A) 45° B) 54° C) 60° D) 66° E) 72°



15. The bottom of a rectangular box has an area of 8 cm^2 . Its frontal area is 6 cm^2 and its side area is 3 cm^2 . How many cm^3 is its volume?

- A) 12 B) 17 C) 24 D) 72 E) 144

16. Rob, Simon and Tom play cards. Beforehand, they put money in the pool in the ratio

R:S:T = 1:2:3. After the play is over, they have to divide the pool in the ratio R:S:T = 4:5:6. What happened?

- A) Rob and Simon have lost money, Tom has won money
- B) Rob and Tom have won money, Simon has lost money
- C) Rob has won money, Simon has kept equal, Tom has lost money
- D) Rob has lost money, Simon has kept equal, Tom has won money
- E) none of the above answers is correct.

17. A scale that was not correctly adjusted to zero showed 67 kg for Linda and 59 kg for Polly.

When both stepped onto it, it showed 131 kg.

What is the real weight of Linda?

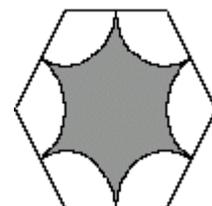
- A) 54 kg B) 62 kg C) 64 kg D) 70 kg E) 72 kg

18. The most experienced animal attendant needs 40 minutes to wash an elephant. His son needs 2 hours to do the same job. How long does it take them, working together, to wash three elephants?

- A) 30 min. B) 45 min. C) 60 min. D) 90 min. E) 100 min.

19. ABCDEF is a regular hexagon with sides 6. Around its vertices pieces of circles are drawn such that these circles have equal radius and touch each other, as shown. What is the perimeter of the grey region?

- A) $3p$ B) $6p$ C) $9p$ D) $12p$ E) $15p$



20. In Kangaroo-town the following holds: 20% of all cars is red, 60% of all red cars have four doors and 50% of all cars that are not red, don't have four doors.

Which part of all cars with four doors in Kangaroo-town is red?

- A) $3/13$ B) $2/11$ C) $1/5$ D) $1/8$ E) $3/14$

Questions 11 to 20: +5 points for each correct answer, -1/4 point for each incorrect answer

21. On a numberline we put a red or a blue mark at each integer. If somewhere there is a red mark, then five units to the right there is a blue mark. If somewhere there is a blue mark, then five units to the left there is a red mark. How many possibilities are there to put marks on the line satisfying these conditions?

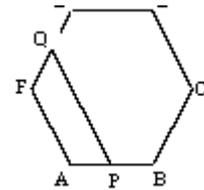
A) 2 B) 25 C) 32 D) 125 E) 256

22. The product can also be written as:

A) B) C) 4^{1000} D) 1 E) 0

23. ABCDEF is a regular hexagon with area 72. P and Q are the midpoints of AB and EF, respectively. What is the area of APQF?

A) 10 B) 12 C) 15 D) 18 E) 20



24. The March Hare always lies on Monday, Tuesday and Wednesday, and never on the other days. On a certain day he told Alice :

”Yesterday, I lied• and also ”On the two days after tomorrow I will be lying•.

What day was it when he said that to Alice?

A) Monday B) Tuesday C) Wednesday D) Thursday E) Friday

25. A kangaroo walks along the sides of a square ABCD with a constant speed (ABCDABC...).

His sister walks to and fro along the diagonal AC with the same constant speed (ACAC...).

They start at the same time in point A. Then you are sure that:

A) After some time they will meet again at A.

B) Never will they meet again.

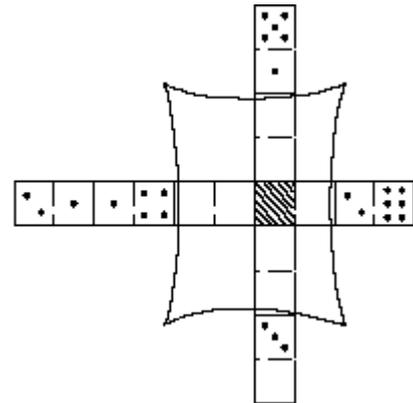
C) At some moment they will meet at C.

D) Only if the sides of the square are p they will meet at C.

E) Only if the sides of the square are $\sqrt{2}$ will they meet again at A.

26. In the figure you see 9 *distinct* domino pieces neatly arranged, with matching faces having an equal number of dots. The cloth prevents us to see the dots on the covered pieces. What is the number of dots on the central, grey colored square?

- A) 0 B) 2 C) 3 D) 4 E) 6



27. You have nine coins in your pocket. If you take out six coins at random, you will always have at least one 'gulden' and two 'kwartjes'. (A 'gulden' is f 1,00 and a 'kwartje' is f 0,25.) What is the total value of the nine coins?

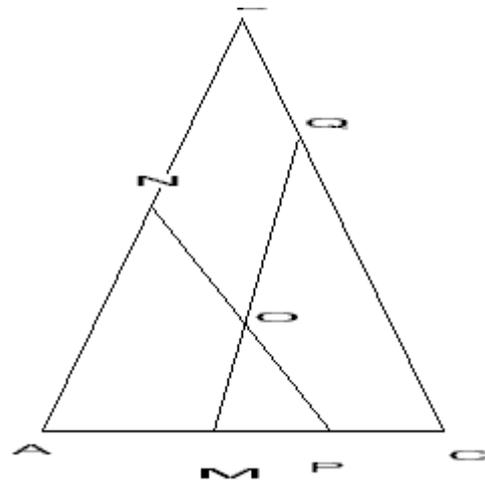
- A) f 3,00 B) f 4,50 C) f 5,25 D) f 7,50 E) this cannot be calculated

28. Every time a wish is fulfilled, the longer side of a magical rectangle loses half of its length, and its shorter side loses a third of its length. After three wishes, its area is only 4 cm². Originally, its shorter side was 9 cm. What was the length of its longer side?

- A) 4 cm B) 12 cm C) 18 cm D) 24 cm E) 36 cm

29. Triangle ABC is equilateral with $AB = BC = AC = 10$. Points M, N, P en Q are chosen such that $AM = BN = 4$ and $CP = BQ = 3$. (see the figure, not exactly drawn to scale). How large is angle NOQ ?

- A) 45° B) 50° C) 54° D) 55° E) 60°



30. What is the last non-zero digit in the decimal notation of $\frac{1}{5^{2000}}$

- A) 2 B) 4 C) 5 D) 6 E) 8