VBO+MAVO 3 & 4

### *Welcome to the Kangaroo Contest!*

- You have 75 minutes to do this test. Don't be disappointed when you find that you cannot answer all the questions, just do what you can and have fun!
- The use of a calculator is not allowed.
- Fill in the answer sheet very carefully, using a pencil.
- About scoring points:
  * You get 30 points to start with.
  * For each correct answer 3, 4 or 5 points are added to your total.
  * For each incorrect answer ¾, 1 or 1¼ point are deducted from your total.
  * If you don't answer a question, you neither gain nor lose points.
- The correct answers are shown on **Teletekst page 437** from Monday evening the 24th of March.

### *We wish you lots of success and fun!*

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*Questions 1 to 10: +3 points for each **correct** answer, −¾ points for each **incorrect** answer*

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1. Square *ABCD* has sides of length 1. What is the area of the rectangle *AEFC*?
   A) $\frac{1}{2}$ B) $\frac{1}{3}$ C) 1   D) 2   E) 3
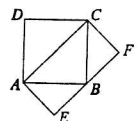
2. This morning Laura looked in the mirror and saw a clock that was in reality behind her. "The clock has stopped", she said, "it shows five minutes to four!" Laura was wrong. What was the correct time at that moment?
   A) 8:05   B) 7:50   C) 7:55   D) 10 past 8   E) 5 minutes to 9

3. The figure on the right is not symmetrical. What is the least number of white squares you need to blacken in order to obtain a symmetrical figure?
   A) 1   B) 2   C) 3   D) 4   E) 5
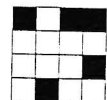
4. A prime number is an integer, greater than 1, divisible only by 1 and by itself. Examples of prime numbers are 3 and 11. The number 14 on the other hand is not a prime number, as it is divisible by 2 and by 7. Which one of the five numbers below is *not* a prime?
   A) 17   B) 19   C) 79   D) 91   E) 97

5. The area of the grey triangle equals 18. What is the area of the parallelogram *ABCD*?
   A) 18   B) 27   C) 36   D) 45   E) 54

6. Maria is looking at a triangle with vertices A, B and C. Her task is to draw a fourth point D such that the points A, B, C en D will be the vertices of a parallelogram. How many different positions are there for point D?
   A) 1   B) 2   C) 3   D) 4   E) none

7. An electronic clock is now showing the time 19:57:33. After how many seconds will all digits change simultaneously for the first time?
   A) 147 secs   B) 120 secs   C) 60 secs   D) 27 secs   E) 1 sec

8. On the right you see a cube. Point F is the middle of edge BC, point G is the middle of edge BE. Which is the shortest route over the cube from A to D?
   A) ABD   B) ACD   C) AFD   D) AED   E) ABGD

9. In a shop I buy: a pair of trousers for f128,50; a blouse for f97,50; a sweater for f102.50 and a coat for f271,50. At the cash point I receive a 15% discount on the trousers, 25% on the blouse, 25% on the sweater and 15% on the coat. How much must I pay altogether?
   A) f490   B) f600   C) f480   D) f485   E) f500

10. The square has sides of length 2 cm. The area of the grey part is how many cm²?
    A) 1   B) 2   C) $1\frac{7}{9}$ D) $1\frac{1}{3}$ E) $1\frac{1}{2}$

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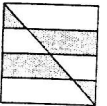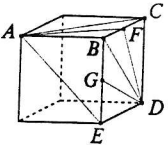
*Questions 11 to 20: +4 points for each **correct** answer, −1 point for each **incorrect** answer*

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11. Which one of the following five numbers is closest to the number $\frac{21\times0.3\times1997}{1000}$?
    A) 0,001   B) 0,01   C) 0,1   D) 1   E) 10

12. We fold a newspaper sheet in half four times, each time changing the direction of folding. We then tear off the four corners of the resulting rectangle and we unfold the sheet. How many holes will we then see?
    A) 1   B) 6   C) 8   D) 9   E) 16

13. On the right you see a ship's flag. Every side of the rectangle is divided into three equal parts. What is the ratio of the areas of the white and the grey part of the flag?
    A) 1:1   B) 1:2   C) 1:3   D) 1:4   E) 2:3

14. Anne did eight tests. She received 2, 3, 4 or 5 points for each test. Anne states: "My average score on the first six tests was 3½ points, but eventually my overall average score was 4 points!" Wat was Anne's average score on the final two tests?
    A) 4   B) 4½   C) 5   D) 5½   E) Anne's statement cannot be correct

15. A circle with radius 3 cm encloses the rectangle ABCD. The points P, Q, R and S are the the middles of the sides of the rectangle. What is the perimeter of the diamond PQRS?
    A) 6 cm   B) 8 cm   C) 9 cm   D) 12 cm   E) it's impossible to calculate this
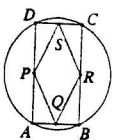
16. In a plane I draw six different straight lines through a point A. What is the maximum number of right angles that I can get in this way at point A?
    A) 3   B) 6   C) 9   D) 12   E) 15

17. The "football" on the right is a solid with 32 faces: 20 regular hexagons and 12 regular pentagons. How many vertices does this football possess?
   A) 42   B) 54   C) 60   D) 72   E) 90

18. On the planet Mars, living creatures called Martians were discovered. A scientist declared: "Every Martian has 2 heads." Subsequently he was proved to be wrong. Which one of the following five statements is true?
    A) No Martian has 2 heads.
    B) Every Martian has more than 2 heads.
    C) There is a Martian with 1 head.
    D) There is a Martian not having 2 heads.
    E) There is a Martian with more than 2 heads.

19. In December Charles had a large amount of money in his wallet. In January he spent 50% of this amount. In February he spent 20% of what he had left, and in March he spent 10% of the then remaining amount. What percentage of his December amount has Charles spent in total in these three months?
    A) $26\frac{2}{3}\%$ B) 60%   C) 64%   D) 70%   E) 80%

20. ABCDEFGH is a cube. What is the angle between the diagonals FA and FH?
   A) 45°   B) 60°   C) 75°   D) 90°   E) 100°
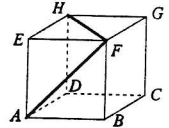
*Questions 21 to 30: +5 points for each **correct** answer, −1¼ point for each **incorrect** answer*

21. Rectangle ABCD has an area of 10 cm². We extended all four sides of the rectangle making them all twice as long. What is the area of the resulting parallelogram?
   A) 20 cm²   B) 30 cm²   C) 40 cm²   D) 50 cm²   E) 80 cm²
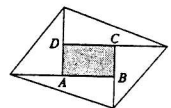
22. We have a large supply of equal puzzle pieces. Every piece consists of four small cubes of 1 cm³ each, glued together, as shown on the right. Using these pieces we **cannot** build a cube of size
    A) 2×2×2 cm³   B) 4×4×4 cm³   C) 6×6×6 cm³
   D) 8×8×8 cm³   E) 9×9×9 cm³
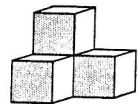
23. Pinokkio has a large collection of calendars from previous years. He hasn't got a 1997 calendar. However, he can use an old calendar for 1997. From which year can this calendar be?
    A) 1986   B) 1987   C) 1989   D) 1990   E) 1996

24. M is the centre of the circle enclosing triangle ABC. The triangle is isosceles with AC=BC. Furthermore we know that ∠MAC=24°. What is the size of ∠MAB ?
   A) 40°   B) 42°   C) 45°   D) 48°   E) 66°
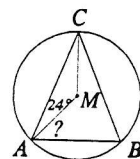
25. On the right you see five jigsaw pieces. Using just four of them, you can make a square. Which is the one to be left out?
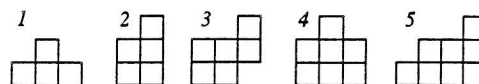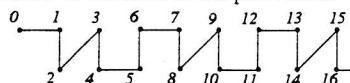
    A) piece 1   B) piece 2   C) piece 3   D) piece 4   E) piece 5

26. Twelve small cubes - each having edges of length 1 cm - together form a rectangular block of size 2 cm by 2 cm by 3 cm. We stick a needle through this block, through two opposite vertices. This needle runs through how many of the twelve small cubes?
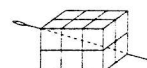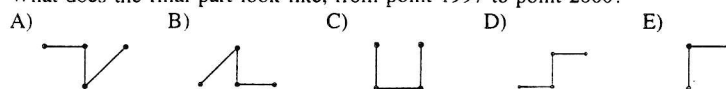
    A) 3   B) 4   C) 5   D) 6   E) 8

27. The regular pattern shown below is extended to the point 2000.

    What does the final part look like, from point 1997 to point 2000?

    A)   B)   C)   D)   E)

28. Villains always lie and knights always speak the truth, as you know. In a group of five people, everyone is a villain or a knight. All five are asked how many villains there are in the group. The answers are: "One", "Two", "Three", "Four" and "Five". How many villains are there really?

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

29. A triangular piece of land is surrounded by a ditch. The sides of the triangle are 12 m, 16 m and 20 m. The ditch is 2 m wide. What is the area (in m²) of the ditch, correct to two decimal places?

    A) 96.00   B) 99.14   C) 102.28   D) 105.42   E) 108.57

30. On the right a game board is shown having 64 square cells, 32 white ones and 32 grey ones. How many squares - built up of complete cells only - on the board consist of an equal number of white cells and grey cells?

    A) 4   B) 13   C) 25   D) 28   E) 40

Students in more than twelve countries will participate in the 1997 European Kangaroo. In the Netherlands the Kangaroo Game is organised by the "Stichting Wiskunde Kangoeroe", *under the auspices of the* "Nederlandse Onderwijs Commissie voor Wiskunde" *established by the* "Wiskundig Genootschap".