



If you are interested in logical puzzles: the first round of the Dutch Championship Puzzlesports starts soon. See: www.puzzelsport.nl

EUROPEAN KANGAROO MATHEMATICS CONTEST

Friday March 22th 2002

1st & 2nd YEAR

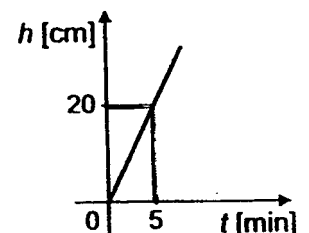
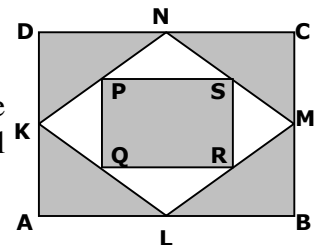
Welcome to the Kangaroo Contest !

- You have 75 minutes to do the test. Don't be disappointed if you cannot answer all the questions; just do what you can and have fun!
- The use of a pocket 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 $\frac{3}{4}$, 1 or $1\frac{1}{4}$ points are deducted from your total.
 - * If you don't answer a question, you neither gain nor lose points.
- The correct answers are shown from Wednesday March 27th on the website: www.sci.kun.nl/math/kangoeroe

We wish you lots of success and fun!

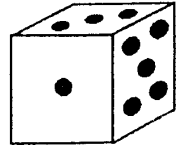
Questions 1 to 10: for every correct answer +3 points, for every incorrect answer - $\frac{3}{4}$ point.

1. Andrew, Bianca en Claire are eating 17 toffees together. Andrew eats more toffees than each of the other two kids. What is the smallest number of toffees that Andrew could have eaten?
A. 5 B. 6 C. 7 D. 8 E. 9
2. A box of apples costs 2 Euros, a box of pears costs 3 Euros and a box of prunes costs 4 Euros. Jeremy buys 8 boxes altogether and he has to pay 23 Euros. What is the biggest number of boxes of prunes he could have bought?
A. 1 B. 2 C. 3 D. 4 E. 5
3. At Fiona's birthday party a game is being played. Fiona counts aloud from 1 till 100. Every time she says a number that is either divisible by three or ending in a 3 the other kids have to say 'boom'. How often do they have to say 'boom'?
A. 30 B. 33 C. 36 D. 39 E. 43
4. In London on the first of July the sun comes up at 04:53 and goes down at 21:25. Exactly halfway this period of time the sun reaches its highest point. What time is it then?
A. 8:16 B. 11:08 C. 12:00 D. 12:39 E. 13:09
5. K, L, M and N are the midpoints of the sides of a rectangle ABCD. In the same way P, Q, R and S are the midpoints of the sides of quadrilateral KLMN. What part of rectangle ABCD is coloured gray?
A. $\frac{3}{5}$ B. $\frac{2}{3}$ C. $\frac{5}{7}$ D. $\frac{3}{4}$ E. $\frac{5}{6}$
6. An empty swimming pool is being filled with water. The water flows at a constant rate. In the graph you can see the waterheight plotted against the time. How many minutes does it take the water to reach a height of 120 cm?
A. 15 B. 20 C. 25 D. 28 E. 30

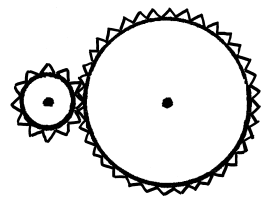


7. Sean, Monica, John and Peter each have a pet. Altogether they have a dog, a cat, a goldfish and a canary. Monica's pet is hairy, Peter's pet has four legs and John has a bird. Sean and Monica don't have cats. Which of the following statements is false?
- A. Peter has a dog.
 B. John has a canary.
 C. Sean has a goldfish.
 D. Peter has a cat.
 E. Monica has a dog.

8. A special six-sided dice has six spots on its bottom, four on its left hand side and two on its back. The dice is thrown and you count the number of visible spots. What is the biggest possible outcome?
- A. 9 B. 12 C. 13 D. 14 E. 15



9. A machine has two tandrads. The radius of the big rad is three times the radius of the small rad. What happens to the small rad when the big rad is rotated 360° clockwise?
- A. The small rad rotates 360° clockwise.
 B. The small rad rotates 360° three times clockwise.
 C. The small rad rotates 360° three times anticlockwise.
 D. The small rad rotates 360° nine times clockwise.
 E. The small rad rotates 360° nine times anticlockwise.

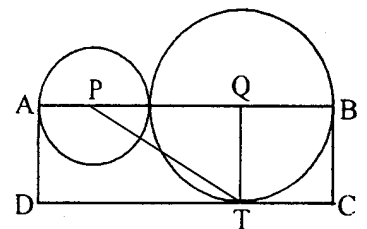


10. Sean reads exactly 23 pages every day. Today he started a book having 2002 pages. How many days does he need to read the whole book? And how many pages will he read on the final day in a new book?
- A. 87 days en 0 pages of the new book.
 B. 87 days en 1 page of the new book.
 C. 88 days en 20 pages of the new book.
 D. 88 days en 21 pages of the new book.
 E. 88 days en 22 pages of the new book.

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

11. In a certain month three Sundays are on even days in that month. (the 2nd, or the 4th, or the 6th, etc.). On what day is the 20th of that month?
- A. Monday B. Tuesday C. Wednesday D. Thursday E. Saturday

12. P and Q are the centres of the circles and ABCD is a rectangle having area 15. What is the area of triangle PTQ?
- A. $3\frac{1}{2}$ B. $3\frac{3}{4}$ C. 4 D. $4\frac{1}{4}$ E. $4\frac{1}{2}$



13. Chris has drawn two circles and three straight lines and he coloured all points of intersection. What is the biggest number of points of intersection he could have coloured?
- A. 14 B. 15 C. 16 D. 17 E. 18

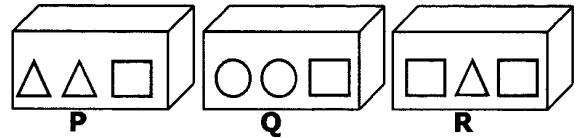
14. Which of the following fractions is the biggest?

A. $\frac{7}{8}$ B. $\frac{66}{77}$ C. $\frac{555}{666}$ D. $\frac{4444}{5555}$ E. $\frac{33333}{44444}$

15. In Canada some people speak only English, some speak only French and the rest speaks French as well as English. 85% speak English, 75% speak French. How many percent speak both French and English?
- A. 25% B. 40% C. 50% D. 57% E. 60%

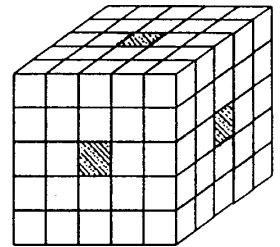
16. Alan, Benjamin, Christine and Daniela bought their dad a present. The present has been hidden by one of them. When their mother asked them who did it, they answered as follows:
 Alan: 'It wasn't me'. Christine: 'Daniela did it'.
 Benjamin: 'It wasn't me'. Daniela: 'Benjamin did it'.
 Exactly one of the children has told a lie. Who hid the present?
 A. Alan B. Benjamin C. Christine D. Daniela E. One can't tell.

17. Three boxes P, Q and R containing weights are arranged in ascending order of weight with the lightest one first. So P is the lightest box and R is the heaviest one. There is a fourth box standing aside that has to fit in the row without disturbing the ascending order of weight. Which of the following statements, with respect to this fourth box, is true?



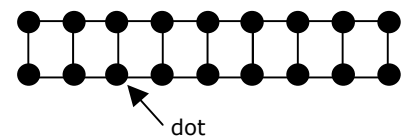
- A. The box should be the first one in the row.
 B. The box should be in between P and Q.
 C. The box should be in between Q and R.
 D. The box should be the last one in the row.
 E. The box has the same weight as R.

18. A cube of side 5 consists of little cubes of side 1. Three rows are removed from the cube. So now you are able to look through the cube into three directions. Then you dip the object in a tin of paint. How many of the little cubes have exactly one painted face?



- A. 24 B. 26 C. 30 D. 40 E. 48

19. You have to put some coins on the black dots in the shape shown. If you don't put a coin on a certain dot, you'll have to put a coin on at least one of its adjacent dots. What is the smallest number of coins you need?



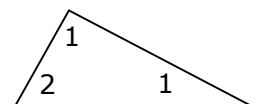
- A. 5 B. 6 C. 7 D. 8 E. 9

20. If Mr. Bean stands still on an escalator he is up in 60 seconds. If the escalator stands still and Mr. Bean walks it, he is up in 90 seconds. How many seconds does it take Mr. Bean to be up if he walks the moving escalator?
 A. 30 B. 36 C. 45 D. 50 E. 75

Questions 21 to 30: for every correct answer +5 points, for every incorrect answer -1¼ point.

21. Five girls stepped on the scales, in pairs, in every possible combination. The following weights are read from the scales: 90 kg, 92 kg, 93 kg, 94 kg, 95 kg, 96 kg, 97 kg, 98 kg, 100 kg en 101 kg. What is the total weight of all girls together?
 A. 225 kg B. 230 kg C. 239 kg D. 240 kg E. 250 kg

22. Mary-Ann writes a 1, 2, 3, 4 or 5 in every angle of the triangle shown. None of the numbers written in the bottom angles is smaller than the number written in the top angle. How many different possibilities are there?
 A. 10 B. 20 C. 30 D. 55 E. 125

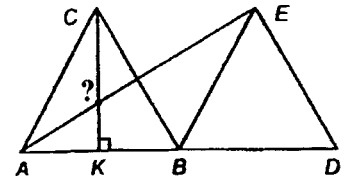


23. Peter writes down a sequence of positive integers. He starts with a 1 and then he writes down a second number. Every next number is the sum of all previous numbers in Peter's sequence. One of the numbers is 1000. What is the smallest number he could have chosen for his second number?
 A. 1 B. 2 C. 124 D. 249 E. 999

24. On Wendy's birthday party there are six glasses of soft drinks for every child. Unexpectedly three cousins of Wendy's arrive. Because of that there are five glasses of soft drinks for every child now. How many children were at the party before the three cousins arrived?
 A. 4 B. 11 C. 14 D. 15 E. 18

25. In some reservation live a lot of female kangaroos. 25% of these female kangaroos are light brown and 75% are dark brown. 50% of the light brown (female) kangaroos have a baby and 20% of the dark brown ones have a baby. All female kangaroos together have 99 babies. How many female kangaroos live in that reservation?
 A. 99 B. 240 C. 300 D. 340 E. 360

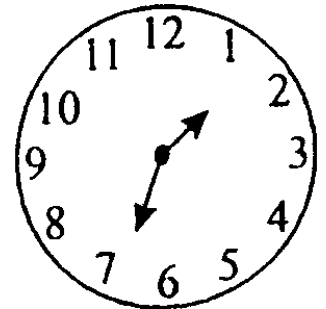
26. ABC and BDE are equilateral. B is the midpoint of AD and CK is perpendicular to AB. What is the size of the angle marked with a questionmark?
 A. 60° B. 90° C. 120° D. 135° E. 150°



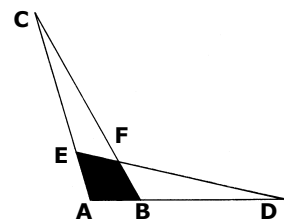
27. A kangaroo wants to go from the Dom in Utrecht to the Dam in Amsterdam (37 km). Its first jump is one meter; every next jump is twice as big as the previous one. How many jumps take the kangaroo closest to the Dam? (That's when it stops jumping.)
 A. 4 B. 5 C. 14 D. 15 E. 16

28. Peter makes four-different-digit numbers using only the digits 1, 2, 3 and 4. He adds all numbers which he made this way. What is the outcome?
 A. 55550 B. 66660 C. 98760 D. 99990 E. 100000

29. Laura has dropped her clock. Its face has fallen apart into three pieces. When you add the numbers on every piece the answers are the same. The cracks are straight lines and don't run through the numbers on the face. Which statement is true?
 A. 12 and 3 are on different pieces.
 B. 7 and 5 are on different pieces.
 C. 2, 11 and 9 are on the same piece.
 D. 8 and 4 are on the same piece.
 E. 11, 1 and 5 are on the same piece.



30. Triangle ABC and triangle ADE are identical. AB and AE are each 1, AC and AD are each 4. The area of quadrilateral ABFE is ... times as big as the area of triangle ABC.
 A. $\frac{1}{5}$ B. $\frac{1}{4}$ C. $\frac{2}{5}$ D. $\frac{1}{2}$ E. $\frac{2}{3}$



Pupils from 26 countries participate in the European Kangaroo 2002. In The Netherlands, the Kangaroo-contest is organised by the "Stichting Wiskunde Kangoeroe", under the auspices of the "Nederlandse Onderwijs Commissie voor Wiskunde" of the Wiskundig Genootschap.



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