INTERNATIONAL KANGAROO MATHEMATICS CONTEST 2007

Level Cadet: Class (7 & 8)   **Max Time: 1 Hour & 35 Min**

## 3-Point-Problems

Q1. $\dfrac{2007}{2+0+0+7} =$

    A) 1003   B) 223   C) 213   D) 123

Q2. Rose plants were planted in a line on both sides of the path. The distance between each plant was 2 m. What is the maximum number of plants that were planted if the path is 20 m long?

    A) 22   B) 20   C) 12   D) 11

Q3. The robot starts walking on the table from the place *A*2 in the direction of arrow, as shown on the picture. It can go always forward. If it meets with difficulties (black boxes and the boundary), it turns right. The robot will stop in case, if he can't go forward after turning right. On which place will it stop
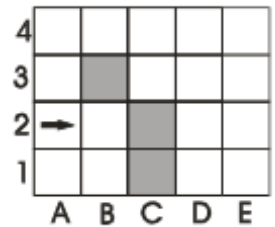
    A) *B*2   B) *A*1   C) *E*1   D) nowhere

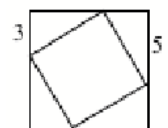**Q4.** What is the sum of the points on the invisible faces of the dice?
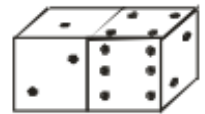
    A) 15   B) 12   C) 7   D) 27

Q 5. If the sum of two positive integers is 11, then the maximum of their product will be
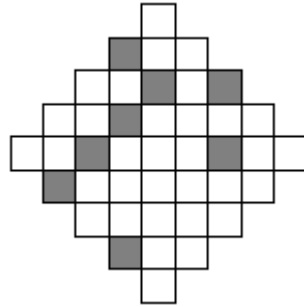
    A) 24   B) 28   C) 30   D) 32

Q6. A small square is inscribed in a big one as shown in the figure. Find the area of the small square

    A) 16   B) 28   C) 34   D) 36

Q7. At least how many little squares we have to shade in the picture on the right so that it has an axis of symmetry?

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

Q8. A palindromic number is one that reads the same backwards as forwards, so 13931 is a palindromic number. What is the difference between the smallest 5-digit palindromic number and the largest 6-digit palindromic numbers?

A) 989989   B) 989998   C) 998998   D) 999898

Q9. On the picture, there are six identical circles. The circles touch the sides of a large rectangle and each other as well. The vertices of the small rectangle lie in the centres of the four circles. The circumference of the small rectangle is 60 cm. What is the circumference of the large rectangle?
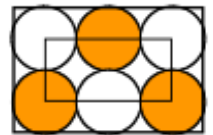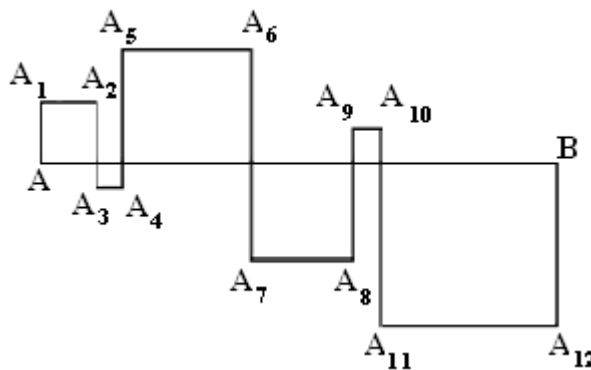
A) 160 cm   B) 120 cm   C) 100 cm   D) 80 cm

Q10. x is a strictly negative integer. Which is the biggest?

A) $-2x$ B) $2x$ C) $6x+2$ D) $x - 2$

4-Point-Problems

Q11. The squares are formed by intersecting the segment AB of length 24 *cm* by the broken line $AA_1A_2 \ldots A_{12}B$ (see the Fig.). Find the length of $AA_1A_2 \ldots A_{12}B$.

A) 48 cm   B) 72 cm   C) 96 cm   D) 106 cm

Q12. On parallel lines l_1 and l_2, 6 points were drawn; 4 on line l_1 and 2 on line l_2. What is the total number of triangles whose vertices are given points?

    A) 6   B) 12   C) 16   D) 18

Q13. A survey found that 2/3 of all customers buy product A and 1/3 buy product B. After a publicity campaign for product B a new survey showed that 1/4 of the customers who preferred product A are now buying product B. So now we have

    A) 1/4 of the customers buy product A, 3/4 buy product B
    B) 7/12 of the customers buy product A, 5/12 buy product B
    C) 1/2 of the customers buy product A, 1/2 buy product B
    D) 1/3 of the customers buy product A, 2/3 buy product B

Q14. In order to obtain the number 8^8, we must raise 4^4 to the power

    A) 3   B) 2   C) 4   D) 8

Q15. ABC and CDE are equal equilateral triangles. If angle $ACD = 80°$, what is angle ABD?
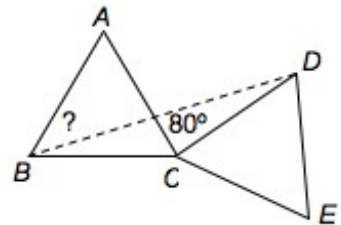
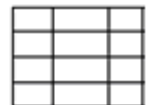   A) $25°$ B) $30°$ C) $35°$ D) $40°$

Q16. Look at the numbers 1, 2, 3, 4, . . . , 100. How many percent of these numbers is a perfect square?

    A) 1%   B) 5%   C) 25%   D) 10%

Q17. By drawing 9 line segments (5 horizontal and 4 vertical) as shown in figure, Amir has made a table of 12 cells. If he had used 6 horizontal and 3 vertical lines, he would have got 10 cells only. How many cells you can get maximally if you draw at most 15 lines?

    A) 30   B) 36   C) 40   D) 42

Q18. How many possible routes with the minimum number of moves are there for a man to travel from A to B of the grid (man can move to any adjacent square, including diagonally)
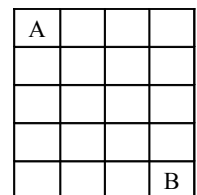
   A) 4   B) 3   C) 5   D) 2

Q19. If you choose three numbers from the grid shown, so that you have one number from each row and also have one number from each column, and then add the three numbers together, what is the largest total that can be obtained?

1	2	3
4	5	6
7	8	9

    A) 18   B) 15   C) 21   D) 24

Q20. The segments OA, OB, OC and OD are drawn from the center O of the square $KLMN$ to its sides so that $\angle AOB = 90°$ and $\angle COD = 90°$ (as shown in the figure). If the side of the square equals 2, the area of the shaded part equals.
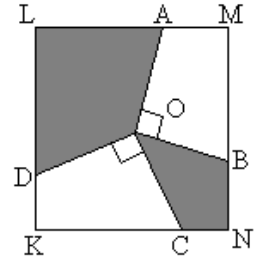
    A) 1   B) 2   C) 2.5   D) 2.25

5-Point-Problems

Q21. A broken calculator does not display the digit 1. For example, if we type in the number 3131, only the number 33 is displayed, with no spaces. Awais typed a 6-digit number into that calculator, but only 2007 appeared on the display. How many numbers could have Awais typed?

    A) 12   B) 13   C) 14   D) 15

Q22. The first digit of a 4-digit number is equal to the number of zeros in this number, the second digit is equal to the number of digits 1, the third digit is equal to the number of digits 2, the fourth - the number of digits 3. How many such numbers exist?

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

Q23. A positive integer number n has 2 divisors, while $n+1$ has 3 divisors. How many divisors does $n + 2$ have?

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

Q24. The table 3×3 contains natural numbers (see picture). Nasir and Ali crossed out four numbers each so that the sum of the numbers crossed out by Nasir is three times as great as the sum of the numbers, crossed out by Ali. The number which remained in the table after crossing is:

4	12	8
13	24	14
7	5	23

    A) 4   B) 14   C) 23   D) 24

Q25. Five integers are written around a circle in such a way that no two or three consecutive numbers give a sum divisible by 3. Among those 5 numbers, how many are divisible by 3?

    A) 0   B) 1   C) 2   D) 3