Đề thi toán Kangaroo Mỹ lớp 7-8 năm 2009

1. **3 points questions**

Among these numbers, which one is even?

2009 x 9
2008 + 2009
2000 - 9
2000 x 9
2000 + 9

2. At a party there were 4 boys and 4 girls. Boys danced only with girls and girls danced only with boys. Afterwards we asked all of them, how many dance partners they each had. The boys said: 3, 1, 2, 2. Three of girls said: 2, 2, 2.What number did the fourth girl say?

0
1
2
3
4

3. In the figure, the triangle consists of 9 identical equilateral triangles. The perimeter of the outer big triangle is 36 cm. What is the value of the perimeter of the shaded inner hexagon?

6 cm
12 cm
18 cm
24 cm
30 cm

4. Harry is a postman. One day he has to deliver packages to Kangourou street delivering one package to each odd numbered house. The first house he visited was number 15 and the last one was number 53, while he visited all the houses in between with odd number in their address. In how many houses did Harry deliver a package?

19
20
27
38
53

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5. The area of the big square is 1. What is the area of the black little square?

1/100
1/300
1/600
1/900
1/1000

6. What is the remainder of the division of 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 x 9 x 10 x 11 x 12 x 13 x 14 x 15 - 6 by 13?

4
5
6
7
8

7. In a garden there are cats and dogs. All the cats together have double number of legs than the noses of all dogs together. Then the number of cats is

twice the number of dogs
the same as the number of dogs
half of the number of dogs
the 1/4 of the number of dogs
four times the number of dogs

8. In the triangle ΑΒΓ , the angle ΒΑΔ is equal to o32 . In addition ΑΒΑΔ ΓΔ==. How many degrees is the angle ΒΑΓ?

32o
37o
64o
69o
74o

9. Due to restrictions in weight, in an elevator it is only permitted to enter 12 adults maximum or 20 children maximum. It is understood the elevator can enter mixed adults and children. If 9 adults entered the elevator, what is the maximum number of children that can enter? (For practical reasons we assume that all adults have the same weight, all children have the same weight and 12 adults weigh as much as 20 children).

3
4
5

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6
8

10. Which of the following links requires more than one piece of rope to construct?

1, 3, 4 and 5
3, 4 and 5
1, 3 and 5
all
none of them

11. **4 points questions**

How many natural numbers from 1 to 30 inclusive, have the property that their square and cube have the same number of digits?

none
1
3
4
9

12. What is the smallest number of points in the figure one needs to remove so that no 3 of the remaining points are collinear?

1
2
3
4
7

13. Nick drew an acute and an obtuse triangle. The four of the angles of the two triangles were 120^{o} ,80^{o} ,55^{o} and 10^{o} . How many degrees is the smallest angle of the acute triangle?

5^{o}
10^{o}
45^{o}
55^{o}
we cannot find it

14. What is the area of the shaded region, if the length of the outer square is 1?

1/4
π /12
(π+2) /16

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π /4
1/3

15. In an island there are 3 inhabitants. Some of them always say the truth and the rest always say lies. One day, these 3 people stood in a queue. Every one of the last two in line said that the person in front of him is a liar. The first one on line said that the other two are liars. How many of the 3 people on this island are liars.
none
1
2
3
we cannot find it

16. The product of four distinct natural numbers is 100. What is their sum?
10
12
15
18
20

17. n the equality of products A x B x Γ x Δ x E = A x Z x H x Θ x I x K. Every letter represents a different number from the digits 0, 1, 2, 3, ..., 9. How many different values could the product A x Γ H x K have?
1
2
3
4
5

18. We want to colour the squares in the grid using colours A, B, C and D in such a way that neighbouring squares do not have the same colour (squares that share a vertex are considered neighbours). Some of the squares have been coloured as shown. What are the possibilities for the shaded square?

A
B
C
D
there are two different possibilities

19. Andreas, Vasilis, Yiannis and Demetris have books in their bags. One of them has one book in his bag,another one has two, another has three and the last one has four books in his bag. Andreas, Vasilis and

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Demetris have together 6 books. Vasilis and Yiannis together have 6 books. Vasilis has in his bag less books than Andreas. Who is the one that has only one book in his bag;

Andreas
Vasilis
Yiannis
Demetris

20. The first three patterns are shown. Not including the square hole, how many unit squares are needed to build the 10th pattern in this sequence?

76
80
84
92
100

21. **5 points questions**

Dino calculated the value of the expression 2009 - 2008 + 2007 - 2006 + ... + 5 - 4 - 3 - 2 - 1 and Dina calculated the value of the expression 2008 - 2007 + 2006 - 2005 + ... + 4 - 3 + 2 - 1. What is the sum of the values of both Dino and Dina?

1004
2008
2009
4017
none of the previous

22. How many four-digit numbers composed only of digits 1,2,3 exist, in which any two neighbouring digits differ by 1 ? (Repetition of digits is allowed).

6
7
8
9
more than 9

23. In a straight road we mark the distances in Km from a tree. A sign shows 1/5 Km and another shows 1/3Km from the tree. What is the position of the sign that shows 1/4 Km from the tree?

at α
at β
at γ

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at δ
at ε

24.

John and Demetri had the same cube. John painted the outer surface of his cube. Demetri made three cuts of his cube in order to make eight smaller cuboids and then he painted the outer surface of the eight smaller cuboids. How much more paint did Demetri used compared to John?

the same
one and a half times more
double
triple
quadruple

25. We place a square of dimensions 6 cm x 6 cm on top of a triangle. The shaded common region covers the 60% of the triangle. The same region covers the 2/3 of the square. What is the area of the triangle?

114/5 cm_2
24 cm_2
36 cm_2
40 cm_2
60 cm_2

26. Costa wrote on a computer the products of the consecutive numbers 1 x 2, 1 x 2 x 3, 1 x 2 x 3 x 4, 1 x 2 x 3 x 4 x 5, ..., 1 x 2 x 3 x 4 x ... x 100.
Then he added all these numbers. What is the last digit of the number he found?
0
2
4
9
other digit

27. Tasia drew a strange windmill. He began drawing 5 lines passing through the same point and then she connected them with some smaller lines. In this way 5 triangles were established with a common vertex. What is the sum of the of the marked 10 angles of the 5 triangles?

360_o
540_o
720_o

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900_o
other answer

28. Five friends, Anna, Viky, Yianna, Danae and Elli compared their height. We observe that
• Anna is the shortest of all
• Danae is taller than Viky but shorter than Elli
Which of the following is definitely wrong?
Yianna is taller than Anna
Yianna is taller than Ellli
Viky is shorter than Danae
Viky is taller than Elli
Elli is taller than Viky

29. We write the natural number 1, 2, 3, 4, ..., consecutively in three columns of squares, as shown in the figure. In places where there is X, the square remains empty. The empty squares are in triples diagonal. What is the number in the 100_{th} square of the middle column?

197
199
200
299
none of the previous

30. The product of three natural numbers is equal to 140. The second of the numbers is seven times the first one, and the third of the numbers is smaller than the second. What is the sum of the three natural numbers?
19
21
28
43
we cannot find it

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