

MATH KANGAROO 2004 in USA
Level of Grades 7 - 8

3 points each

1.7m

1. What is the value of the expression: $2004 - 2004$

- A) 400,800 B) 0 C) 1204 D) 1200 E) 2804

2. Tom has \$147 and Stan has \$57. How much money does Tom need to give to Stan, so that he would have twice as much money left as Stan would have then?

- A) \$11 B) \$19 C) \$30 D) \$45 E) \$49

3. What is the remainder when dividing the sum: $2001 + 2002 + 2003 + 2004 + 2005$ by 2004?

- A) 1 B) 2001 C) 2002 D) 2003 E) 1999

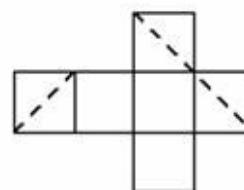
4. In each of the little squares Karolina places one of the digits: 1, 2, 3, 4. She makes sure that in each row and each column each of these numbers is placed. In the figure below, you can see the way she started. In how many ways can she fill the square marked with an x ?

1		x	
4	1		
	3		
	2		

- A) None B) 1 C) 2 D) 3 E) 4

5. What is the value of the expression: $(1 - 2) - (3 - 4) - (5 - 6) - (7 - 8) - (9 - 10) - (11 - 12)$?

- A) -6 B) 0 C) 4 D) 6 E) 13

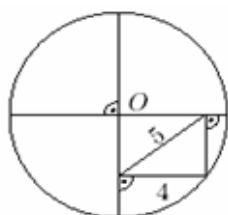


6. A section was made on a cube. On the net of the cube this section was indicated with a perforated line (see the figure). What figure was made by the section?

- A) Equilateral triangle B) A rectangle but not a square
C) Right triangle D) Square E) Hexagon

7. If the length and the width of a rectangle were increased by 10% each, then the area of that rectangle increased by:

- A) 10% B) 20% C) 21% D) 100% E) 121%



14

8. What is the length of the diameter of the circle shown in the figure?

- A) 18 B) 16 C) 10 D) 12 E)

9. An ice cream stand was selling ice cream in five different flavors. A group of children came to the stand and each child bought two scoops of ice cream with two different flavors. If none of the children chose the same combination of flavors and every such combination of flavors was chosen, how many children were there?

- A) 5 B) 10 C) 20 D) 25 E) 30

10. The number x was multiplied by 0.5 and the product was divided by 3. The result was squared and 1 was added to it. The final result was 50. What was the value of number x ?

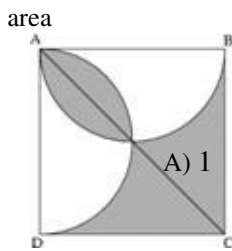
- A) 18 B) 24 C) 30 D) 40 E) 42

4 points each

11. Alfonso the ostrich was training for the *Head in the Sand Competition* in the Animal Olympiad. He put his head in the sand at 8:15 on Monday morning and reached his new personal record by keeping it underground for 98 hours and 56 minutes. When did Alfonso pull his head out of the sand?

- A) On Thursday at 5:19 A.M. B) On Thursday at 5:41 A.M. C) On Thursday at 11:11 A.M.
 D) On Friday at 5:19 A.M. E) On Friday at 11:11 A.M.

12. Two semicircles with diameters AB and AD were inscribed in square ABCD (see the figure). If $|AB| = 2$, then what is the



of the shaded region?

- A) 1 B) 2 C) $\sqrt{2}$ D) $2\sqrt{2}$ E) $\frac{3}{4}$

13. If a and b are positive integers, neither of which is divisible by 10, and if $a \cdot b = 10,000$ then the sum $a + b$ is:

- A) 1024 B) 641 C) 1258 D) 2401 E) 1000

14. There were more Thursdays than Tuesdays in the first of two consecutive years. Which day of the week appeared the most in the second year, if neither of these years was a leap year?

- A) Tuesday B) Wednesday C) Friday D) Saturday E) Sunday

15. Isosceles triangle ABC satisfies: $|AB| = |AC| = 5$, and angle $BAC > 60^\circ$. The length of the perimeter of this triangle is expressed with a whole number. How many triangles of that kind are there?

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

16. How many divisors does number $2 \times 3 \times 5 \times 7 \times 11$ have?

- A) 2310 B) 10 C) 5 D) 2004 E) 32

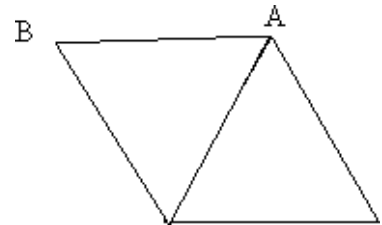
17. Tad has a large number of building blocks which are rectangular prisms with dimensions $1 \times 2 \times 3$. What is the smallest number of blocks needed to build a solid cube?

- A) 12 B) 18 C) 24 D) 36 E) 60

18. Each of 5 children wrote one of the numbers: 1, 2, 4 on the board. Then the written numbers were multiplied. Which number can be the product of those numbers?

- A) 100 B) 120 C) 256 D) 768 E) 2048

19. The average age of a grandmother, a grandfather and 7 grandchildren is 28. The average age of 7 grandchildren is 15 years. How old is the grandfather, if he is 3 years older than the grandmother.



- A) 71 B) 72 C) 73 D) 74 E) 75

20. The equilateral triangle ACD is rotated contrary clockwise around point A. What is the angle of rotation when triangle ACD covers triangle ABC the first time?

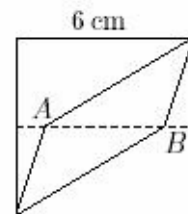
- A) 60° B) 120° C) 180° D) 240° E) 300°

5 points each

21. There are at least two kangaroos in the enclosure. One of them said: "There are 6 of us here" and he jumped out of the enclosure. Afterwards, every minute one kangaroo was jumping out of the enclosure saying: "Everybody who jumped out before me was lying." This continued until there were no kangaroos left in the enclosure. How many kangaroos were telling the truth?

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

22. Points A and B are placed on a line which connects the midpoints of two opposite sides of a square with side of 6 cm (see the figure). When you draw lines from A and B to two opposite vertices, you divide the square in three parts of equal area. What is the length of segment AB?



- A) 3.6 cm B) 3.8 cm C) 4.0 cm D) 4.2 cm E) 4.4 cm

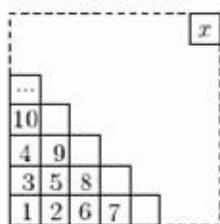
23. Jack rides his bike from home to school uphill with average speed of 10 km/h. On the way back home his speed is 30km/h. What is the average speed of his round trip?

- A) 12 km/h B) 15 km/h C) 20 km/h D) 22 km/h E) 25km/h

24. John put magazines on a bookshelf. They have either 48 or 52 pages. Which one of the following numbers cannot be the total number of pages of all the magazines on the bookshelf?

- A) 500 B) 524 C) 568 D) 588 E) 620

25. Inside the little squares of a big square the consecutive natural numbers were placed in a way shown in the picture.



Which of the following numbers cannot be placed in square x ?

- A) 128 B) 256 C) 81 D) 121 E) 400

26. In the figure there are 11 boxes. Number 7 was written in the first box and number 6 was written in the ninth box. What was the number placed in the second field with the following condition: the sums of each three consecutive numbers in the boxes are equal to 21?



- A) 7 B) 10 C) 8 D) 6 E) 21

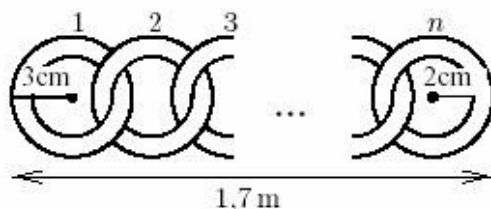
27. For each triple of numbers (a, b, c) another triple of numbers $(b + c, c + a, a + b)$ was created. This was called *operation*. 2004 such *operations* were made starting with numbers $(1, 3, 5)$, and resulting with numbers (x, y, z) . The difference $x - y$ equals to:

- A) -2 B) 2 C) 4008 D) 2004 E) $(-2)^{2004}$

28. Number 2004 is divisible by 12 and the sum of its digits is equal to 6. Altogether, how many four-digit numbers have these two properties?

- A) 10 B) 12 C) 13 D) 15 E) 18

29. Rings with dimensions shown in the figure were linked together, forming 1.7m long chain. How many rings were used to create the chain?



- A) 30 B) 21 C) 42 D) 85 E) 17

30. On each face of a cube a certain natural number was written, and at each vertex a number equal to the product of the numbers on the three faces adjacent to that vertex was placed. If the sum of the numbers on the vertices is 70 then what is the sum of the numbers on all the faces of the cube?

- A) 12 B) 35 C) 14 D) 10 E) Cannot be determined.

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