

# Math Kangaroo 2007 in USA

International Competition in Mathematics

Level of grade 5 • Level of grade 6

March 15, 2007

## 3 point questions

1. Evaluate:  $2007 : (2 + 0 + 0 + 7) - 2 \times 0 \times 0 \times 7$

- A) 1.                      B) 9.                      C) 214.                      D) 223.                      E) 2007.

2. Donald's grandfather sleeps through exactly a quarter of the day. Donald sleeps one and a half times as long as his grandfather. What fraction of the day does Donald spend sleeping?

- A)  $\frac{1}{6}$                       B)  $\frac{1}{2}$                       C)  $\frac{1}{8}$                       D)  $\frac{3}{8}$                       E)  $\frac{3}{4}$

3. Two angles of a certain triangle measure  $12^\circ$  and  $48^\circ$ . What is the measure of the third angle?  
A)  $30^\circ$                       B)  $300^\circ$                       C)  $100^\circ$                       D)  $120^\circ$                       E)  $90^\circ$

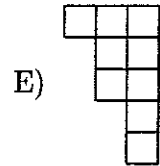
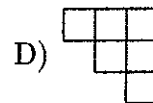
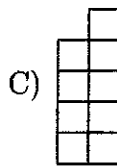
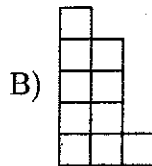
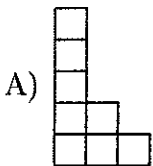
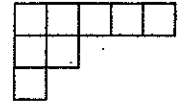
4. Each kangaroo jump takes the same amount of time. If it takes a kangaroo 6 seconds to make 4 jumps, how long will it take the kangaroo to make 10 jumps?

- A) 10 sec                      B) 12 sec                      C) 15 sec                      D) 18 sec                      E) 20 sec

5. Adam's digital watch shows 16:07. He observes that the sum of the digits in the hour and the sum of the digits in the minutes are equal. How many times will this be true between 16:00 and 17:00?

- A) 10                      B) 6                      C) 7                      D) 8                      E) 3

6. One of the following five pieces forms a rectangle when fitted together with the piece that is shown to the right. Which one?



7. The given square must be filled in such a way that each of the digits 1, 2, 3 appears in each row and in each column once and only once. If Harry started to fill in the square as shown, in how many ways he can complete the task?

1		
2	1	

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

8. Jan was born on January 1<sup>st</sup>, 2002, and is older than Peter by 1 day less than 1 year. What is the date of Peter's birth?

- A) January 2<sup>nd</sup>, 2003                      B) January 2<sup>nd</sup>, 2001                      C) December 31<sup>st</sup>, 2000  
D) December 31<sup>st</sup>, 2002                      E) December 31<sup>st</sup>, 2003

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9. Alex is 8 years older than her two sisters who are twins. The sum of the ages of all three girls is 32 years. How old is Alex?

- A) 12                      B) 18                      C) 16                      D) 20                      E) 14

10. What will be the height of a structure obtained by cutting a cube measuring 1 meter on one edge into cubes having the edge length of 1 decimeter and stacking all the decimeter cubes?

- A) 100 m.                      B) 1 km.                      C) 10 km.                      D) 1000 km.                      E) 10 m.

## 4 point questions

11. Wanda cut a square sheet of paper with a perimeter of 20 inches into two rectangles. One of the rectangles has a perimeter of 16 inches. What is the perimeter of the other rectangle?

- A) 8 in                      B) 9 in                      C) 12 in                      D) 14 in                      E) 16 in

12. A square grid is composed of smaller squares. The diagonals of this larger square grid are drawn, and then Hanna colored the smaller squares that the diagonals passed through. How many squares make up the grid if she colored a total of 9 squares?

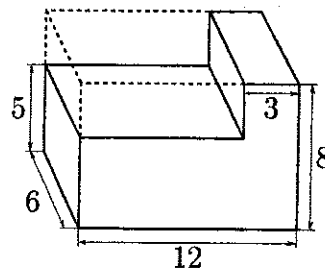
- A) 9                      B) 16                      C) 25                      D) 64                      E) 81

13. Alex, Ben, Carl, and Daniel each participates in a different sport: karate, soccer, volleyball, and judo. Alex does not like sports played with a ball. Ben practices judo and often attends soccer games to watch his friend play. One of the following statements is true. Which one?

- A) Alex plays volleyball.                      B) Ben plays soccer.                      C) Carl plays volleyball.  
D) Daniel does karate.                      E) Alex does judo.

14. By what amount will the surface area of the given rectangular block decrease if a rectangular section is removed as shown?

- A) 27                      B) 54                      C) 72                      D) 108                      E) 126



15. Kate has a rectangular strip of cardboard 27 inches long which she divides into 4 sections of different lengths. She then draws two line segments connecting the centers of two adjacent rectangles as shown in the diagram. Find the sum of the lengths of these two line segments.



- A) 12 cm                      B) 13.5 cm                      C) 14 cm                      D) 14.5 cm  
E) The sum depends on the lengths of the four sections.

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16. 60 birds were perching on 3 trees. Suddenly some birds flew away and the same number of birds was left on each tree. If 6 birds flew away from the first tree, 8 birds flew away from the second tree, and 4 birds flew away from the third tree, how many birds were there initially on the second tree?

- A) 26                      B) 24                      C) 22                      D) 21                      E) 20

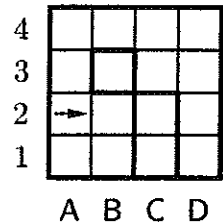
17. Two squares measuring  $9 \times 9$  inches are overlapped so that a  $9 \times 13$  inch rectangle is created. Find the area of the region where the two squares overlap.

- A)  $36 \text{ in}^2$                       B)  $45 \text{ in}^2$                       C)  $54 \text{ in}^2$                       D)  $63 \text{ in}^2$                       E)  $72 \text{ in}^2$

18. Jan let loose a homing pigeon at 7:30 a.m. The pigeon arrived at its destination at 9:10 a.m. How many miles did the pigeon travel if it flies 4 miles in 10 minutes?

- A) 14                      B) 20                      C) 40                      D) 56                      E) 64

19. A mechanical kangaroo moves on the board shown. It begins in square A2 and goes in the forward direction indicated by the arrow. The kangaroo cannot leave the board nor enter the shaded squares. It is programmed to move forward one square at a time until it meets an obstacle in which case it makes a  $90^\circ$  right turn and continues in the new forward direction. It will stop if it cannot continue moving after making a right turn. On which square will the kangaroo stop?



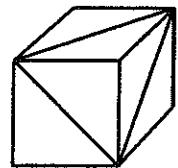
- A) B2                      B) A1                      C) C3                      D) D1                      E) It will never stop.

20. Anna is 10 years old and her mother is 4 times older than Anna. How old will Anna's mother be when Anna is twice as old as she is right now?

- A) 40                      B) 50                      C) 60                      D) 70                      E) 80

## 5 point questions

21. Diagonals are drawn on three adjacent faces of a cube as shown in the figure. From which of the following grids could such a cube be constructed?



- A) B) C) D) E)

22. On the right side of a certain two-digit number the same number has been written, creating a four-digit number. How many times is greater the new four-digit number than the original two-digit number?

- A) 100                      B) 101                      C) 1000                      D) 1001                      E) 10

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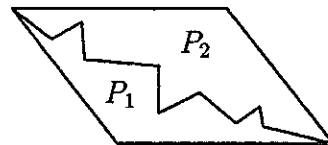
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23. A parallelogram is divided into two parts  $P_1$  and  $P_2$  as shown. Which of the following statements is true?

- A)  $P_2$  has a larger perimeter than  $P_1$ .
- B)  $P_2$  has a smaller perimeter than  $P_1$ .
- C)  $P_2$  has a smaller area than  $P_1$ .
- D)  $P_1$  and  $P_2$  have equal perimeters.
- E)  $P_1$  and  $P_2$  have equal areas.

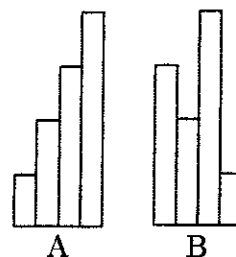


24. What is the 2007<sup>th</sup> letter in the sequence KANGAROOKANGAROOKANG...?

- A) K
- B) A
- C) N
- D) R
- E) O

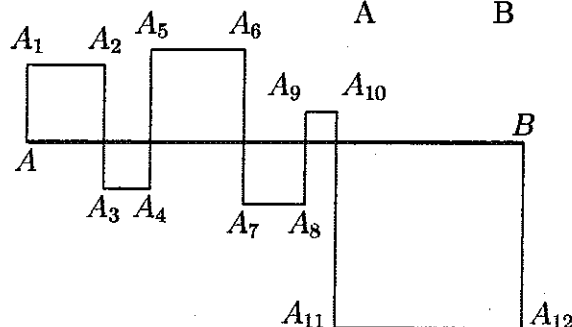
25. Figure A is made of 4 rectangles each 10 inches wide and each rectangle is 25 inches longer than the previous. Figure B is made by rearranging the rectangles that make up figure A. By how much does the perimeter of B exceed the perimeter of A?

- A) 10 in
- B) 20 in
- C) 25 in
- D) 40 in
- E) 50 in



26. In the figure shown to the right squares are formed by partitioning line segment  $AB$  which is 24 inches long. What is the length of the broken line  $AA_1 A_2 A_3 \dots A_{10} A_{11} A_{12} B$ ?

- A) 48 in
- B) 72 in
- C) 96 in
- D) 56 in
- E) 106 in

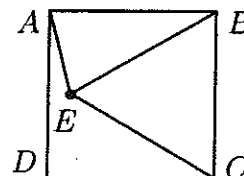


27. Tom thought of an integer, which Robert then multiplied by either 5 or 6. Then Jan added either 5 or 6 to Robert's new number and Adam subtracted either 5 or 6 from Jan's new number to get 73. What integer did Tom think of?

- A) 10
- B) 11
- C) 12
- D) 14
- E) 15

28. The square to the right has a side of 10 inches. Angle  $EAB$  measures 75 degrees, angle  $ABE$  measures 30 degrees. What is the length of segment  $EC$ ?

- A) 8 in
- B) 9 in
- C) 9.5 in
- D) 10 in
- E) 11 in



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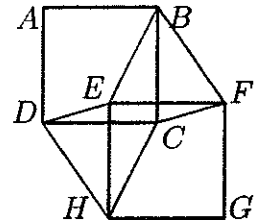
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29. In the figure the squares  $ABCD$  and  $EFGH$  are such that:  $AB = EF$  and  $\overline{AB} \parallel \overline{EF}$ . The area of the shaded region is 1. What is the area of  $ABCD$ ?

- A) 1      B) 2      C)  $1/2$       D)  $3/2$       E) Cannot be determined



30. On a die the sum of the dots on opposite faces is always 7. Four such identical dice make up the figure in the picture. The dice are arranged such that the touching faces have the same number of dots. How many dots are on the face marked with the question mark?

- A) 5      B) 6      C) 2      D) 3      E) Not enough information.

