



Kangaroo 2010 Cadet (8th and 9th class)

NAME _____ CLASS/GROUP _____

Points: _____ **Kangaroo leap:** _____

Separate the answer sheet from the test.

Write your answer under each problem number.

If you do NOT know the answer, leave the space empty.

For each WRONG answer, 1/4 of the points is deducted. DO NOT guess!

PROBLEM	1	2	3	4	5	6	7
ANSWER							

PROBLEM	8	9	10	11	12	13	14
ANSWER							

PROBLEM	15	16	17	18	19	20	21
ANSWER							



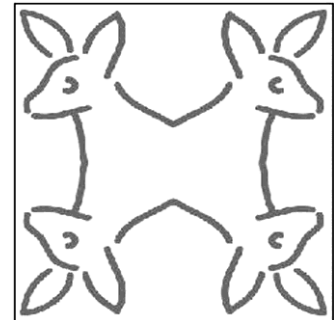
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3 points

1. Calculate $12 + 23 + 34 + 45 + 56 + 67 + 78 + 89$.

- A) 389 B) 396 C) 404 D) 405 E) another answer

2. How many axes of symmetry does the picture on the right have?

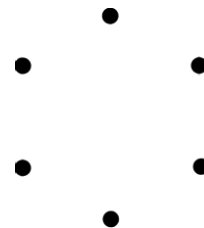


- A) 0 B) 1 C) 2 D) 4 E) infinitely many.

3. Toy kangaroos are packed for shipment. Each of them is packed in a box which is a cube. Exactly eight boxes are packed tightly in a bigger cubic cardboard box. How many kangaroo boxes are on the bottom of the big cube?

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

4. Eleanor draws the six vertices of a regular hexagon and then connects some of the six points with line segments to obtain a geometric figure. This figure is not

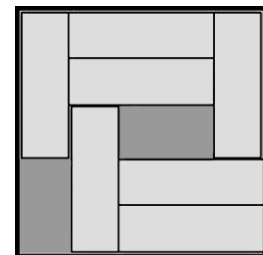


- A) a trapezium B) a right angled triangle C) a square
D) a pentagon E) an obtuse angled triangle.

5. After stocking up firewood, the worker realized that from a certain number of logs he now had made 72 pieces by having done 53 cuts. If he has cut only one log at a time, how many logs were there in the beginning?

- A) 17 B) 18 C) 19 D) 20 E) 21.

6. There are seven bars in the box. The size of them is $3 \text{ cm} \times 1 \text{ cm}$. The box is $5 \text{ cm} \times 5 \text{ cm}$. Is it possible to slide the existing bars so that there will be room for one more bar? If so, what is the least amount of bars that must be moved?

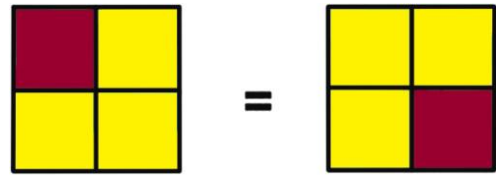


- A) 2 B) 3 C) 4 D) 5 E) It is impossible.



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7. A square is divided into four smaller ones, all of which are the same size. The smaller squares are colored either red or yellow. In how many different ways can the colors be used in order to create a colored picture? Note: The pictures on the right are considered the same, ie. rotation of squares does not produce a DIFFERENT result.



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

4 points

8. Grandma baked a cake for her grandchildren, who will visit her in the afternoon. Unfortunately she forgot whether three, five or all six of her grandchildren will come over. She wants to make sure that every child gets the same amount of cake. In order to be prepared for all three possibilities she must cut the cake into

- A) 12 pieces B) 15 pieces C) 18 pieces D) 24 pieces E) 30 pieces.

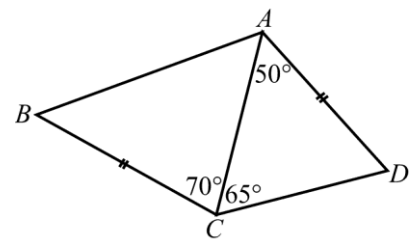
9. Which of the following is the smallest positive two-digit number that is not the sum of three different one-digit numbers?

- A) 10 B) 15 C) 23 D) 25 E) 28.

10. Cathy needs 18 minutes to make a long ribbon by stitching together three short ribbons one after the other. How long does it take her to make a really long ribbon by stitching together six short ribbons in the same way?

- A) 27 min B) 30 min C) 36 min D) 45 min E) 60 min.

11. In the quadrilateral $ABCD$ we have $AD = BC$, $\angle DAC = 50^\circ$, $\angle DCA = 65^\circ$, $\angle ACB = 70^\circ$ (see the fig.). Find the value of $\angle ABC$.

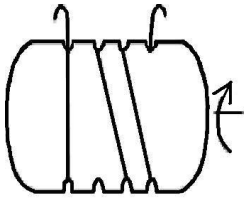


- A) 50° B) 55° C) 60° D) 65° E) It is not possible to determine the answer.



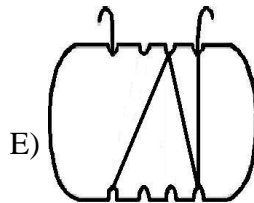
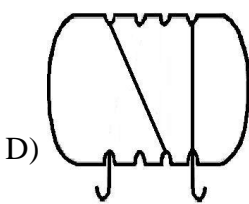
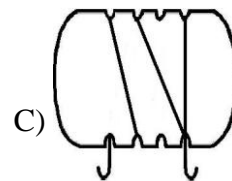
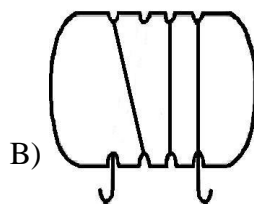
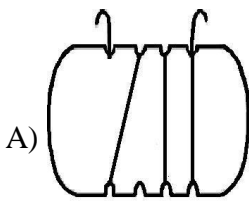
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12. Andrea has wound some rope around a piece of wood. As shown with the arrow, she rotates her piece of wood to see the backside.



Front side

What does she see after the rotation?



13. A plane is divided into five regions. What is the least number of straight lines that will accomplish this?

- A) 3 B) 4 C) 5 D) 6 E) another answer

14. If $a - 1 = b + 2 = c - 3 = d + 4 = e - 5$, then which of the numbers a, b, c, d, e is the biggest?

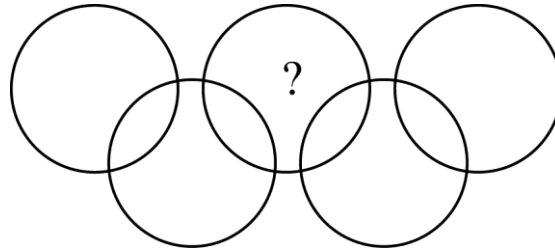
- A) a B) b C) c D) d E) e



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5 points

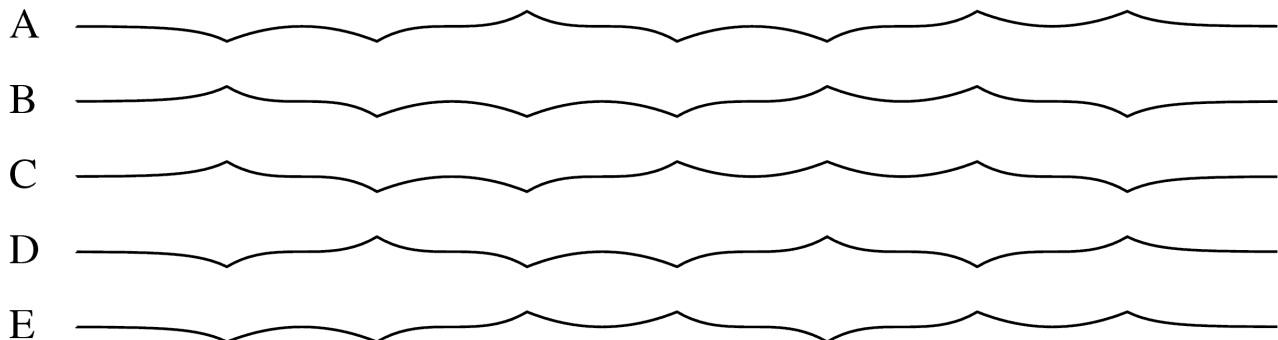
15. In the figure below there are nine regions inside the circles. Place the numbers from 1 to 9 in the regions, one number in each region. The sum of the numbers inside each circle must be 11. You may use each number only once.



Which number must be written in the region with the question mark?

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

16. A paper strip was folded three times in half and then completely unfolded so that you can still see the 7 folds going up or down. Which of the following side views can not be obtained this way?



17. There are 18 cards. On each card, either a four or a five is written. The sum of all written numbers is divisible by 17. On how many cards is the number four written?

- A) 4 B) 5 C) 6 D) 7 E) 9.

18. Natural numbers from 1 to 10 are written on the board. A class of students plays a game where the first student deletes two of the numbers, then writes their sum decreased by one on the board. The second student deletes two of the numbers, then writes their sum decreased by one on the board. The game continues until only one number remains on the board. What is the remaining number?

- A) less than 11 B) 11 C) 46 D) greater than 46 E) another answer



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19. In a town there are only knights and liars. Every sentence spoken by a knight is true, every sentence spoken by a liar is false. One day some citizens were in a house and three of them spoke:

- 1) The first one said: "There are no more than three people in the house. Everyone in the house is a liar."
- 2) The second said: "There are no more than four people in the house. Not everyone in the house is a liar."
- 3) The third said: "There are five people in the house. Three of the people in the house are liars."

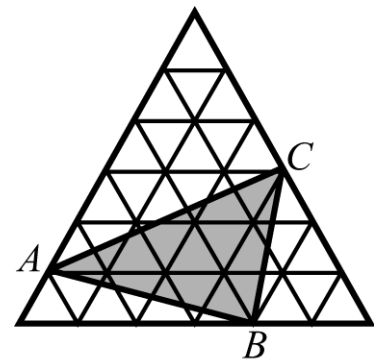
How many people are in the house and how many of them are liars?

- A) 3 people, 1 of them a liar B) 4 people, 1 of them a liar C) 4 people, 2 of them liars
D) 5 people, 2 of them liars E) 5 people, 3 of them liars.

20. A Kangaroo has a large collection of small cubes $1 \times 1 \times 1$. Each cube is made of one color. Kangaroo wants to use 27 small cubes to make a $3 \times 3 \times 3$ cube so that any two cubes with at least one common vertex are of different colors. What is the minimum number of colors the kangaroo must use?

- A) 6 B) 8 C) 9 D) 12 E) 27.

21. The biggest equilateral triangle consists of 36 smaller equilateral triangles with an area 1 cm^2 each. Find the area of $\triangle ABC$.



- A) 11 cm^2 B) 12 cm^2 C) 15 cm^2 D) 9 cm^2 E) 10 cm^2 .