MO✱MATH

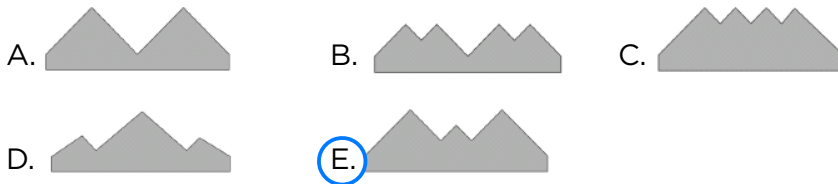# Level 1
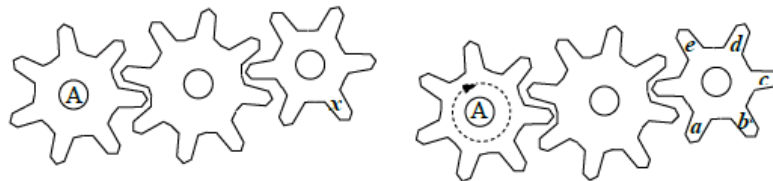
1. The ladybug will sit on a flower that has five petals and three leaves. On which of the flowers below will the ladybug sit?
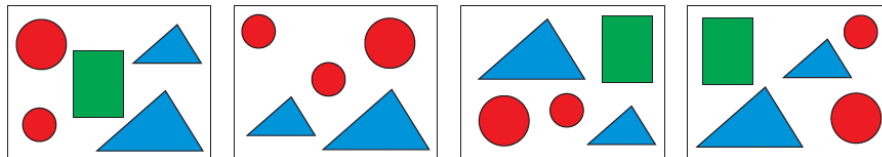
A.　　B.　　C.　　D.　　E.

2. Which of the shapes shown below will fit the above shape exactly to make a rectangle?

A.　　　　B.　　　　C.

D.　　　　E.

3. Cogwheel A turns around completely once. At which place is x now?

A. a　　　　B. b　　　　C. c　　　　D. d　　　　E. e

4. Look closely at these four pictures.

Which figure is missing from one of the pictures?

A.　　B.　　C.　　D.　　E.

Problems selected from Math Kangaroo
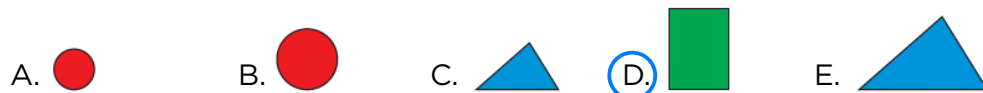
5. Marko has 9 pieces of candy and Tomo has 17 pieces of candy. How many pieces of candy does Tomo need to give to Marko so that each boy has the same number of pieces of candy?

    A. 2   B. 3   C. 4   D. 5   E. 6

6. A ship was attacked by pirates. One by one the pirates climbed a rope to get to the ship. The pirate captain was the eighth pirate to climb, and there were as many pirates in front of him as behind him. How many pirates climbed the rope?

    A. 7   B. 8   C. 12   D. 15   E. 16

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Level 2

1. Which small figure could be the central part of the larger figure with the star?

   A.   B.   C.   (D.)   E.

2. There were some pieces of candy in a bowl. Sally took half of the pieces of candy. Then Tom took half of the pieces left in the bowl. After that, Clara took half of the remaining pieces. In the end there were 6 pieces of candy in the bowl. How many pieces of candy were in the bowl at the beginning?

   A. 12   B. 18   C. 20   D. 24   (E.) 48

3. Eve arranged cards in a line as shown below. In one move, Eve can switch the places of any two cards. What is the smallest number of moves Eve needs to make to get the word KANGAROO?

   | O | A | R | G | O | N | K | A |

   A. 2   (B.) 3   C. 4   D. 5   E. 6

4. $2 \xrightarrow{-\,0} \quad \xrightarrow{+\,1} \quad \xrightarrow{\times\,5} \quad ?$

   A. 6   B. 7   C. 8   D. 10   (E.) 15

5. My umbrella has KANGAROO written on top. It is shown in the picture on the right. Which of the pictures below also shows my umbrella?

   (A.)   B.   C.   D.   E.

Problems selected from Math Kangaroo

6. We can fill a certain barrel with water if we use water from 6 small pitchers, 3 medium pitchers, and one large pitcher, or from 2 small pitchers, 1 medium pitcher, and 3 large pitchers. If we use only large pitchers of water, how many of them do we need to fill the barrel?

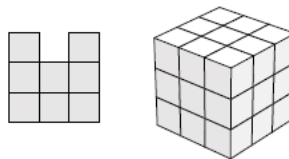A. 4   B. 5   C. 6   D. 7   E. 8

Level 3

1. Arnold spelled the word KANGAROO with cards showing one letter at a time. Unfortunately, some cards were rotated. By turning the K card back by 90° twice he can correct the letter K, and by turning the first A card once he can correct the first A (see the figures). How many times does he need to rotate by 90° for all of the letters to be correct?

   A. 4   B. 5   C. 6   D. 7   E. 8

2. Henry and John started walking from the same point. Henry went 1 km north, 2 km west, 4 km south, and finally 1 km west. John went 1 km east, 4 km south, and 4 km west. Which of the following must be the final part of John's walk in order to reach the point where Henry ended his walk?

   A. He has already reached the same point.   B. 1 km north
   C. 1 km north-west   D. More than 1 km north-west   E. 1 km west

3. The 3 x 3 x 3 cube below is made of 27 small cubes. How many small cubes do you have to take away to see the picture to the left of the cube as the result when looking at the cube from the right, from above, and from the front?

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

4. Sam painted the 9 squares as shown in the figure below using the colors black, white, and gray. At least how many squares does he need to repaint so that no two squares with a common side are the same color?
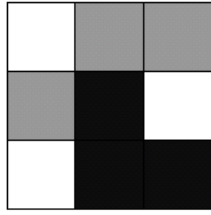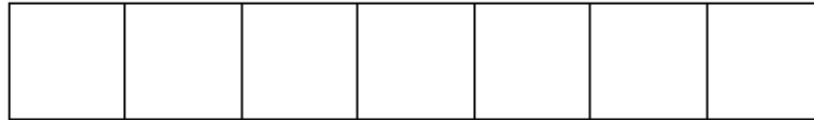

A. 2   B. 3   C. 5   D. 5   E. 6

5. A student wrote down a natural number. When she divided the number by 9, the remainder was 7. What is the remainder when twice that natural number is divided by 9?

A. 1   B. 2   C. 5   D. 6   E. 7

6. In how many ways can you color 3 different cells in the strip shown below so that no 2 neighboring cells are colored?


A. 6   B. 7   C. 8   D. 9   E. 10

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Level 4

1. Each year, the date of the Kangaroo competition is the third Thursday of March. What is the latest possible date of the competition in any year?

    A. March 14th   B. March 15th   C. March 20th
    D. March 21st   E. March 22nd

2. In the diagram, the area of each circle is 1 cm². The area common to two overlapping circles is 1/8 cm². What is the area of the region covered by the five circles shown?
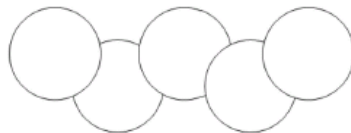
   A. 4 cm²   B. 9/2 cm²   C. 35/8 cm²
    D. 39/8 cm²   E. 19/4 cm²

3. On a pond there are 16 water lily leaves in a 4 by 4 pattern as shown. A frog sits on a leaf in one of the corners. It then jumps from one leaf to another either horizontally or vertically. The frog always jumps over at least one leaf and never lands on the same leaf twice. What is the greatest number of leaves (including the one it is sitting on) that the frog can reach?

    A. 16   B. 15   C. 14   D. 13   E. 12

Problems selected from Math Kangaroo
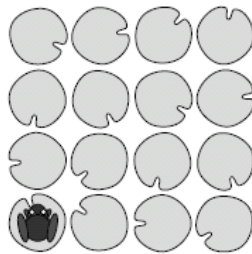
4. The net of a cube with numbered faces is shown in the diagram. Sasha correctly adds the numbers on opposite faces of this cube.
What three totals does Sasha get?

		5	
1	2	3	4
		6	
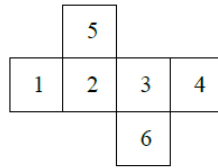
(A) 4, 6, 11   B. 4, 5, 12   C. 5, 6, 10
D. 5, 7, 9   E. 5, 8, 8

5. A bush has 10 branches. Each branch has either 5 leaves only or 2 leaves and 1 flower. Which of the following could be the total number of leaves the bush has?

A. 45   B. 39   C. 37   D. 31   (E) None of A to D

6. In a group of kangaroos, the two lightest kangaroos weigh 25% of the total weight of the group. The three heaviest kangaroos weigh 60% of the total weight. How many kangaroos are in the group?

(A) 6   B. 7   C. 8   D. 15   E. 20

Level 5

1. The MSC *Fabiola* is the largest container ship to ever enter San Francisco Bay. It carries 12,500 containers which, if placed end-to-end, would stretch about 75 km. Roughly, what is the length of one container?

   6

   A. 6 m   B. 16 m   C. 60 m   D. 160 m   E. 600 m

2. In 2014, a grandmother, her daughter, and her granddaughter said that the sum of their ages was 100. In what year was the granddaughter born if each of their ages was a power of 2?

   A. 1998   B. 2006   C. 2010   D. 2012   E. 2013

3. The picture shows the same cube from two different views. It is made up of 27 small cubes, some of which are gray and some white. What is the largest number of gray cubes there could be?
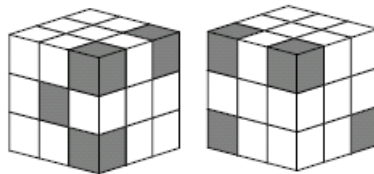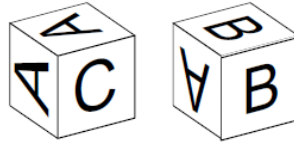

   A. 5   B. 7   C. 8   D. 9   E. 10

4. What is the ones digit of the number $2015^5 + 2015^0 + 2015^1 + 2015^5$?

   A. 1   B. 5   C. 6   D. 7   E. 9

Problems selected from Math Kangaroo

5. One of the letters A, B, or C appears on each of the faces of a certain die. The picture shows this die in two different positions. On how many faces of this die does the letter A appear?


A. 1   B. 2   C. 3   D. 4   E. 5

6. Petra has three different dictionaries and two different novels on a shelf. How many ways are there to arrange the books if she wants to keep the dictionaries together and the novels together?

A. 12   B. 24   C. 30   D. 60   E. 120

Level 6

1. If you take a certain number of 1 × 1 × 1 cubes out of a 5 × 5 × 5 cube, you end up with a solid figure consisting of columns of the same height, which stand on the same ground plate (see figure).   How many small cubes were taken out?
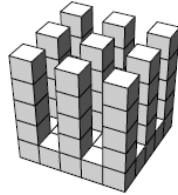
   A. 56   B. 60   C. 64   D. 68   E. 80

2. In a soccer match, the winner gets 3 points, the loser gets 0 points, and in the case of a tie each team gets 1 point. Four teams, A, B, C, and D, take part in a soccer tournament. Each team plays three games, one against each of the other teams. At the end of the tournament team A has 7 points and teams B and C have 4 points each. How many points does team D have?

   A. 0   B. 1   C. 2   D. 3   E. 4

3. There are 10 different positive integers. Exactly 5 of them are divisible by 5 and exactly 7 of them are divisible by 7. Let M be the greatest of these 10 numbers. What is the minimum possible value of M?

   A. 105   B. 77   C. 75   D. 63   E. none of these

4. How many solutions does the equation $2^{2x} = 4^{x+1}$ have?

   A. 0   B. Infinitely many   C. 2   D. 1   E. 3

Problems selected from Math Kangaroo

5. In the figure below, there are three concentric circles and two perpendicular diameters. If the three shaded figures have equal areas and the radius of the smallest circle is 1, what is the product of the three radii?
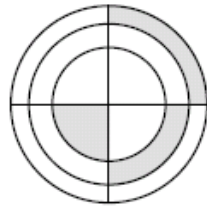
A. $\sqrt{6}$ B. 3   C. $\dfrac{3\sqrt{3}}{2}$ D. $2\sqrt{2}$ E. 6

6. When you read the following statements from left to right, which is the first statement that is true?

A. C is true   B. A is true   C. E is false   D. B is false   E. $1 + 1 = 2$