MO MATH
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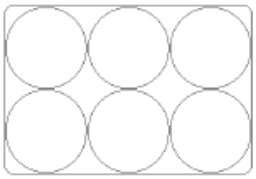
# Level 1

1. How many ropes are there in the picture?

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

2. Lisa's hens lay white eggs and brown eggs. Lisa puts 6 eggs in the box shown below. 2 brown eggs cannot touch each other. At most, how many brown eggs can Lisa put in the box?



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

3. 5 sparrows sat on a wire as shown in the picture. Each sparrow chirped only once to each bird it saw on the side it faced. For example, the second sparrow chirped 1 time. In total, how many times did they chirp?

A. 6 B. 8 C. 9 D. 10 E. 12

*Problems selected from Math Kangaroo*

4. In the picture there are stars with 5 points, stars with 6 points and stars with 7 points. How many stars that have only 5 points are there?

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

5. In which picture are there twice as many apples as carrots and twice as many carrots as pears?

A.  B.  C.  D.  E. 

6. In Old McDonald's Barn there is one horse, two cows, and three pigs. How many more cows does Old McDonald's Barn need so that the number of all the animals is twice the number of cows?

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

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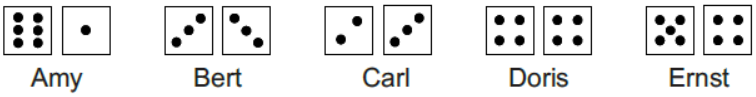
# Level 2

1. Amy, Bert, Carl, Doris, and Ernst each rolled 2 dice and added the number of dots.




Who rolled the largest total?

A. Amy B. Bert C. Carl D. Doris E. Ernst

2. The sum of the digits of the year 2016 is equal to 9. What is the next year, after 2016, where the sum of the digits of the year is equal to 9 again?

A. 2007 B. 2025 C. 2034 D. 2108 E. 2134

3. Magic trees grow in a magic garden. Each tree has either 6 pears and 3 apples, or 8 pears and 4 apples. There are 25 apples in the garden. How many pears are there in the garden?

A. 35 B. 40 C. 45 D. 50 E. 56

4. John looks out the window. He sees half of the kangaroos in the park (see picture). How many kangaroos are there in the park?

A. 12 B. 14 C. 16 D. 18 E. 20

*Problems selected from Math Kangaroo*

5. David wants to prepare a meal with 5 dishes using a stove with only 2 burners. The times needed to cook the 5 dishes are 40 min., 15 min., 35 min., 10 min., and 45 min. What is the shortest time in which he can do it? (He may only remove a dish from the stove when it is done cooking.)

   A. 60 min. B. 70 min. C. 75 min. D. 80 min. E. 85 min.

6. Each of ten bags contains a different number of pieces of candy. The number of pieces of candy in each bag ranges from 1 to 10. Each of five boys took two bags of candy. Alex got 5 pieces of candy, Bob got 7 pieces, Charles got 9 pieces, and Dennis got 15 pieces. How many pieces of candy did Eric get?

   A. 9 B. 11 C. 13 D. 17 E. 19

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# Level 3

1. Which of the following traffic signs has the largest number of lines of symmetry?

A.  B.  C.  D.  E. 

2. Mary, Ann, and Nata work at a kindergarten. Each day from Monday to Friday exactly 2 of them come to work. Mary works 3 days per week, and Ann works 4 days per week. How many days per week does Nata work?

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

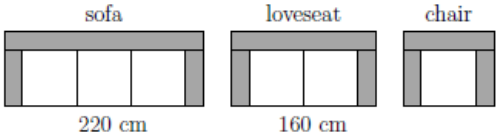
3. Clara wants to construct a big triangle using identical, small triangular tiles. She has already put some tiles together as shown in the picture. What is the smallest number of tiles she needs to complete a triangle?

A. 5 B. 9 C. 12 D. 15 E. 18

4. A special die has a number on each face. The sums of the numbers on opposite faces are all equal. Five of the numbers are 5, 6, 9, 11, and 14. What number is on the sixth face?

A. 4 B. 7 C. 8 D. 13 E. 15

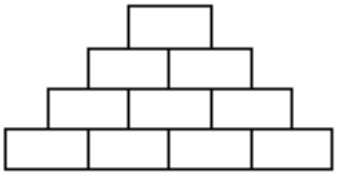
5. The Modern Furniture store is selling sofas, loveseats, and chairs made from identical modular pieces as shown in the picture. Including the armrests, the width of the sofa is 220 cm and the width of the loveseat is 160 cm. What is the width of the chair?




A. 60 cm B. 80 cm C. 90 cm D. 100 cm E. 120 cm

*Problems selected from Math Kangaroo*

6. John wants to write a natural number in each box in the diagram in such a way that each number above the bottom row is the sum of the two numbers in the boxes immediately underneath. What is the largest number of odd numbers that John can write?



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

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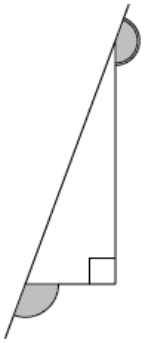
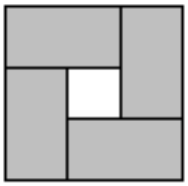
# Level 4

1. What is the sum of the 2 marked angles in the figure below?



A. 150° B. 180° C. 270° D. 320° E. 360°

2. The diagram shows 4 identical rectangles placed inside a square. The perimeter of each rectangle is 16 cm. What is the perimeter of the big square?



A. 16 cm B. 20 cm C. 24 cm D. 28 cm E. 32 cm

3. 12 girls met in a coffee shop. On average, they ate 1.5 cupcakes each. None of them ate more than 2 cupcakes, and 2 of them had only mineral water. How many girls ate 2 cupcakes?

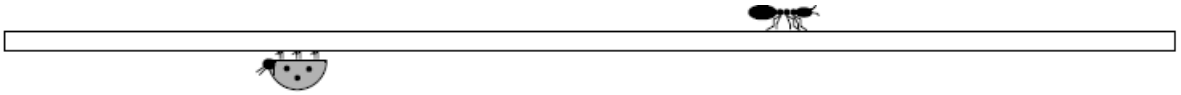
A. 2 B. 5 C. 6 D. 7 E. 8

4. A group of girls stands in a circle. Xena is the fourth to the left from Yana and the seventh to the right from Yana. How many girls are in the group?

A. 9 B. 10 C. 11 D. 12 E. 13

*Problems selected from Math Kangaroo*

5. Annie the Ant started at the left end of a pole and crawled 2/3 of its length. Bob the Beetle started at the right end of the same pole and crawled 3/4 of its length. What fraction of the length of the pole are Annie and Bob now apart?



A. 3/8 B. 1/12 C. 5/7 D. 1/2 (E.) 5/12

6. 10 kangaroos stood in a line as shown in the diagram. At some point, 2 kangaroos standing side by side and facing each other exchanged places by jumping past each other. This was repeated until no further jumps were possible. How many exchanges were made?

A. 15 B. 16 (C.) 18 D. 20 E. 21

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# Level 5

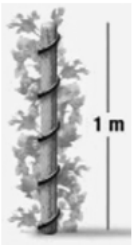
1. On a test consisting of 30 questions, Ruth had 50% more right answers than she had wrong answers. Each answer was either right or wrong. How many correct answers did Ruth have, assuming she answered all questions?

   A. 10 B. 12 C. 15 D. 18 E. 20

2. In a tennis knock-out tournament, six of the results of the quarter-finals, the semi-finals, and the final were (not necessarily in this order): Bella beat Ann, Celine beat Donna, Gena beat Holly, Gena beat Celine, Celine beat Bella, and Emma beat Farah. Which result is missing?

   A. Gena beat Bella
   B. Celine beat Ann
   C. Emma beat Celine
   D. Bella beat Holly
   E. Gena beat Emma

3. A plant wound itself exactly 5 times around a pole with a height of 1 m and a circumference of 15 cm as shown in the picture. As it climbed, its height increased at a constant rate. What is the length of the plant?




   A. 0.75 m B. 1.0 m C. 1.25 m D. 1.5 m E. 1.75 m

*Problems selected from Math Kangaroo*

4. Which of the following pictures shows the path of the center of the wheel when the wheel rolls along the zig-zag line shown?

A. 

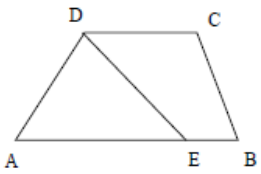
B. 

C. 

D. 

E. 

5. $ABCD$ is a trapezoid with side $AB$ parallel to $CD$, where $AB$ = 50 and $CD$ = 20. $E$ is a point on side $AB$ with the property that the segment $DE$ divides the given trapezoid into two parts of equal area (see figure). Calculate the length $AE$.




A. 25 B. 30 C. 35 D. 40 E. 45

6. There are 4 children of different integer ages under 18. The product of their ages is 882. What is the sum of their ages?

A. 23 B. 25 C. 27 D. 31 E. 33

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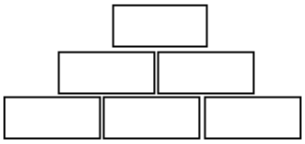
# Level 6

1. Maria wants to build a bridge across a river and knows that the shortest possible bridge from each point on one shore is always of the same length. Which of these pictures cannot be a picture of her river?

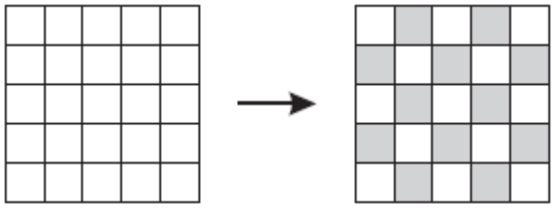
A.  (B.)  C.  D.  E. 

2. In this pyramid of numbers (shown below) each upper field is the product of the 2 fields directly underneath. Which of the following numbers cannot appear in the top field if the 3 bottom fields only contain natural numbers bigger than 1?



A. 56 B. 84 C. 90 (D.) 105 E. 220

3. Consider a 5 x 5 square divided into 25 cells. Initially, all its cells are white. In each move we can change the color of any three consecutive cells in a row or in a column to the opposite color (i.e., white cells become black and black ones become white). What is the smallest possible number of moves needed to obtain the chessboard coloring shown in the figure?



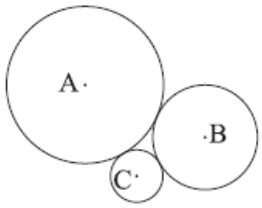
(A.) less than 10 B. 10 C. 12 D. more than 12 E. impossible to do

4. Ben likes to play with his H0-model railroad. He modeled some things in the H0-ratio of 1:87, even a 2 cm high model of his brother. How tall is Ben's brother?

(A.) 1.74 m B. 1.62 m C. 1.86 m D. 1.94 m E. 1.70 m

*Problems selected from Math Kangaroo*

5. Three mutually, externally tangent circles with centers A, B, and C have radii of 3, 2, and 1, respectively. What is the area of the triangle ABC?




A. 6 B. $4\sqrt{3}$ C. $3\sqrt{2}$ D. 9 E. $2\sqrt{6}$

6. The sum of the lengths of the three sides of a right triangle is equal to 18 and the sum of the squares of the lengths of the three sides is equal to 128. What is the area of the triangle?

A. 18 B. 16 C. 12 D. 10 E. 9