

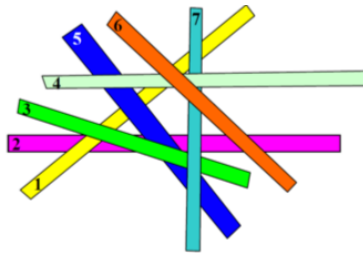
## Level 1

1. The kangaroo is inside how many circles?



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

2. Seven sticks lie on top of each other. Stick number 2 is at the bottom. Stick number 6 is at the top. Which stick is in the middle?



- (A) 1                      (B) 3                      (C) 4                      (D) 5                      (E) 7

3. How many numbers between 10 and 31 (including 31) can be written using only the digits 1, 2, and 3? You can repeat digits.

- (A) 2                      (B) 4                      (C) 6                      (D) 7                      (E) 8

4. My rabbit eats only cabbage and carrots. Last week he ate either 10 carrots or 2 heads of cabbage each day. If he ate a total of 6 heads of cabbage last week, how many carrots did he eat?

- (A) 20                      (B) 30                      (C) 34                      (D) 40                      (E) 50

5. Fedy has 4 red cubes, 3 blue cubes, 2 green cubes, and 1 yellow cube. He is building a tower (see the picture) in such a way that no two cubes touching each other have the same color. What is the color of the cube with the question mark?



- (A) red      (B) blue      (C) green      (D) yellow      (E) impossible to determine

6. Gear A is about to make one complete turn in the direction shown in Figure 1.



Figure 1

The piece  $x$  moved to one of the positions  $a, b, c, d, e$  shown in Figure 2.



Figure 2

To which position did  $x$  move?

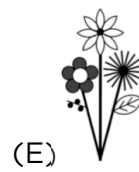
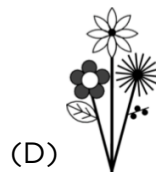
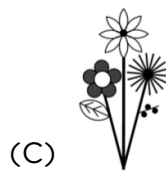
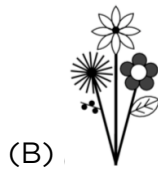
- (A)  $a$       (B)  $b$       (C)  $c$       (D)  $d$       (E)  $e$

## Level 2

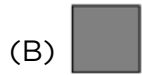
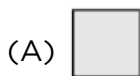
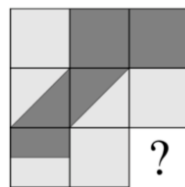
1. When Koko the Koala is not sleeping, he eats 50 grams of leaves per hour. If Koko slept 20 hours yesterday, how many grams of leaves did he eat?

- (A) 0                      (B) 50                      (C) 100                      (D) 200                      (E) 400

2. Mr. Brown has painted flowers on the store window (see the picture). What do these flowers look like from the other side of the window?



3. Which tile must be added to the picture so that the total light area is as large as the total dark area?



4. On planet Kangaroo, each kangyear has 20 kangmonths and each kangmonth has 6 kangweeks. How many kangweeks are there in one quarter of a kangyear?

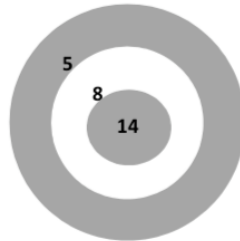
- (A) 9                      (B) 30                      (C) 60                      (D) 90                      (E) 120

5. Eve arranged cards in a line as shown in the figure below. At each move, Eve is allowed to interchange any two cards. What is the smallest number of moves Eve needs to get the word KANGAROO?



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

6. Ann threw seven darts at the dartboard shown in the figure and scored 32 points in total. How many darts did not hit the dartboard?




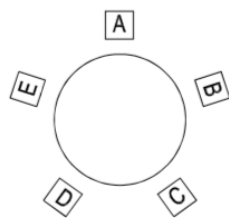
- (A) 2                      (B) 3                      (C) 4                      (D) 5                      (E) 6

## Level 3

1. In the following addition, some of the digits have been replaced by stars.

$$\begin{array}{r}
 1\star 2 \\
 1\star 3 \\
 1\star 4 \\
 \hline
 309
 \end{array}$$

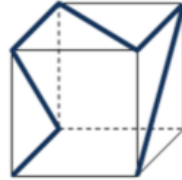
What is the sum of the missing digits?

- (A) 0                      (B) 1                      (C) 2                      (D) 3                      (E) 10
2. The pearl necklace in the picture contains black pearls and white pearls.
- 
- Arno wants to have five of the black pearls. He can only take pearls from either end of the necklace, and so he has to take some of the white pearls also. What is the smallest number of white pearls Arno has to take?
- (A) 2                      (B) 3                      (C) 4                      (D) 5                      (E) 6
3. The kangaroos A, B, C, D, and E were sitting in this order, clockwise, around a circular table. When the bell rang, each kangaroo but one exchanged its position with a neighbor. The order of the kangaroos, clockwise, became A, E, B, D, C. Which kangaroo did not move?
- 
- (A) A                      (B) B                      (C) C                      (D) D                      (E) E
4. Parisa sets her marbles in groups of equal size on the desk. After she arranged the marbles in groups of 3, she found that there were 2 marbles left. Then she arranged the marbles in groups of 5, and again there were 2 marbles left. At least how many more marbles does she need so that there won't be any left when she arranges them in groups of 3 and in groups of 5?
- (A) 3                      (B) 1                      (C) 4                      (D) 10                      (E) 13

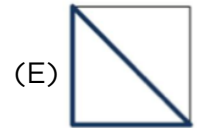
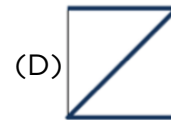
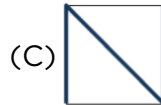
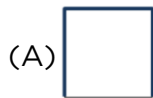
5. Andy made a playlist with 5 songs (A, B, C, D, and E). Song A is 3 minutes long, song B is 2 minutes and 30 seconds, song C is 2 minutes, song D is 1 minute and 30 seconds, and song E is 4 minutes. The songs play in this order in a continuous loop. If Andy left the house when song C was just starting, what song was playing when he got back home 1 hour later?

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

6. A thin colorful ribbon is stuck on a transparent plastic cube (see the picture).

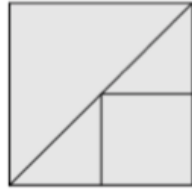


Which of the following pictures does not represent the cube as seen from any perspective?

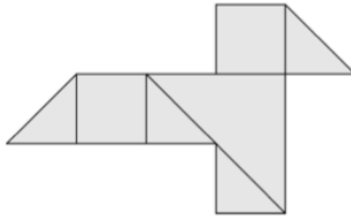


## Level 4

1. Wanda had several square pieces of paper, each piece with an area of 4. She cut them into squares and right-angled triangles in the manner shown in the first diagram.

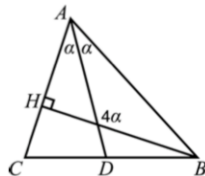


She then took some of the pieces and made the bird shown in the second diagram.



What is the area of the bird?

- (A) 3                      (B) 4                      (C)  $9/2$                       (D) 5                      (E) 6
2. What is the positive number whose reciprocal is equal to its quadruple?
- (A)  $\frac{1}{4}$                       (B)  $\frac{1}{2}$                       (C) 1                      (D) 2                      (E) 4
3. The diagram shows the triangle  $ABC$  in which  $BH$  is a perpendicular height and  $AD$  is the angle bisector at  $A$ . The obtuse angle between  $BH$  and  $AD$  is four times the angle  $DAB$  (see the diagram). What is the measure of the angle  $CAB$ ?

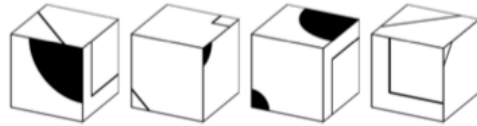


- (A)  $30^\circ$                       (B)  $45^\circ$                       (C)  $60^\circ$                       (D)  $75^\circ$                       (E)  $90^\circ$

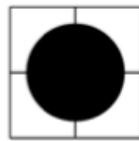
4. The neighbors of a two-digit number are a prime number and a perfect square (a square of a whole number). How many two-digit numbers are there with this property?

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






5. In the picture below, there are four identical cubes seen from different perspectives.



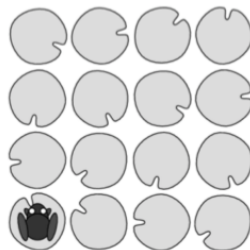
They are arranged so that a big black disk appears on one face, as shown in the picture.



What can be seen on the opposite face?

- (A)       (B)       (C)       (D)       (E) 

6. 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 sits on) that the frog can reach?

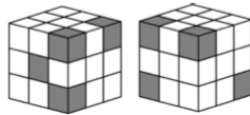


- (A) 16                      (B) 15                      (C) 14                      (D) 13                      (E) 12



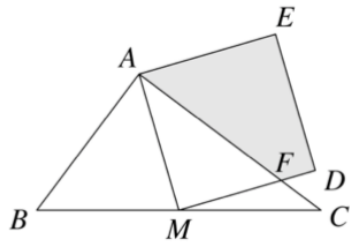
## Level 5

1. Which number is halfway between  $\frac{2}{3}$  and  $\frac{4}{5}$ ?  
 (A)  $\frac{11}{15}$     (B)  $\frac{7}{8}$     (C)  $\frac{3}{4}$     (D)  $\frac{6}{15}$     (E)  $\frac{5}{8}$
  
2. Tom drew a square in the coordinate plane. One of the diagonals of the square lies on the  $x$ -axis. The coordinates of the two vertices on the  $x$ -axis are  $(-1,0)$  and  $(5,0)$ . Which of the following are the coordinates of another vertex of this square?  
 (A)  $(2,0)$     (B)  $(2,3)$     (C)  $(2,-6)$     (D)  $(3,5)$     (E)  $(3,-1)$
  
3. Ann has walked 8 km at a speed of 4 km/h. Now she will run some time with a speed of 8 km/h. How long does she have to run in order to have an overall average speed of 5 km/h?  
 (A) 15 min    (B) 20 min    (C) 30 min    (D) 35 min    (E) 40 min
  
4. Jane, Danielle, and Hannah wanted to buy three identical hats. However, none of them had enough money to cover the price of one hat. Jane was short by a third of the price, Danielle by a fourth, and Hannah by a fifth. One week later, when there was a sale and the price of the hats was reduced by \$9.40 per hat, the sisters combined their money and purchased all three hats, with no change left over. What was the price of one hat before the price reduction?  
 (A) \$12    (B) \$16    (C) \$28    (D) \$36    (E) \$112
  
5. The picture shows the same cube from two different views. It is built from 27 small cubes; some of them are grey and some are white. What is the largest number of grey cubes there could be?



- (A) 5    (B) 7    (C) 8    (D) 9    (E) 10

6. Let  $ABC$  be a triangle such that  $AB = 6\text{cm}$ ,  $AC = 8\text{cm}$ , and  $BC = 10\text{cm}$ , and let  $M$  be the midpoint of  $BC$ .  $AMDE$  is a square, and  $MD$  intersects  $AC$  at point  $F$ . Find the area of quadrilateral  $AFDE$  in  $\text{cm}^2$ .



(A)  $\frac{124}{8}$

(B)  $\frac{125}{8}$

(C)  $\frac{126}{8}$

(D)  $\frac{127}{8}$

(E)  $\frac{128}{8}$

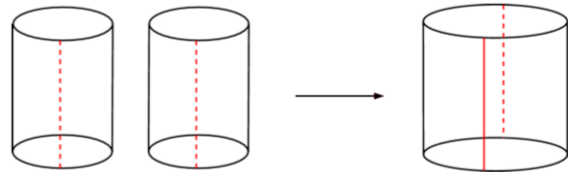
## Level 6

1. The positive integers  $a$  and  $b$  satisfy the equation  $a^2 + b^2 = 100$ . What is the value of  $a + b$ ?

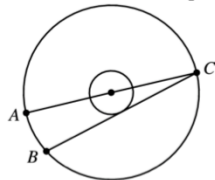
(A) 10                      (B) 11                      (C) 12                      (D) 13                      (E) 14

2. Two identical cylinders are cut open along the dotted lines and glued together to form one bigger cylinder — see the figure. What can you say about the volume of the big cylinder compared to the volume of one small cylinder?

- (A) It has twice the volume.  
 (B) It has 3 times the volume.  
 (C) It has  $\pi$  times the volume.  
 (D) It has 4 times the volume.  
 (E) It has 8 times the volume.



3. The radii of two concentric circles are in proportion 1 : 3.



$AC$  is a diameter of the big circle;  $BC$  is a chord of the big circle which is tangent to the smaller circle; and the length of the segment  $AB$  is 12. What is the radius of the big circle?

(A) 13                      (B) 18                      (C) 21                      (D) 24                      (E) 26

4. The function  $f(x) = ax + b$  satisfies the equalities  $f(f(f(1))) = 29$  and  $f(f(f(0))) = 2$ . What is the value of  $a$ ?

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

5. There are 9 kangaroos called Greatkangs. Their fur is either silver or gold in color. When 3 Greatkangs happen to meet, there is a two in three chance that none of them is silver. How many Greatkangs are gold?

- (A) 1                      (B) 3                      (C) 5                      (D) 6                      (E) 8

6. 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