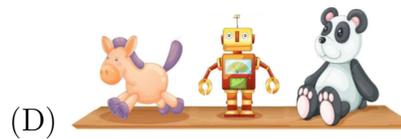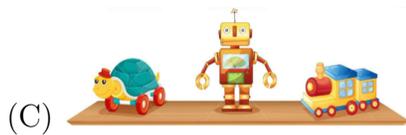# GRADES 1 AND 2

SAMPLE QUESTION FOR 3 POINTS

On Michael's toy shelf, there are no turtles, no rabbits, and no robots. Which of these shelves could be Michael's shelf?

(A)

(B)

(C)

(D)

(E)

SAMPLE QUESTION FOR 4 POINTS

There were 12 pieces of fruit on the table. Vera removed 2 pears, 4 apples, and half of the oranges. Now there are only oranges left on the table. How many oranges are left?
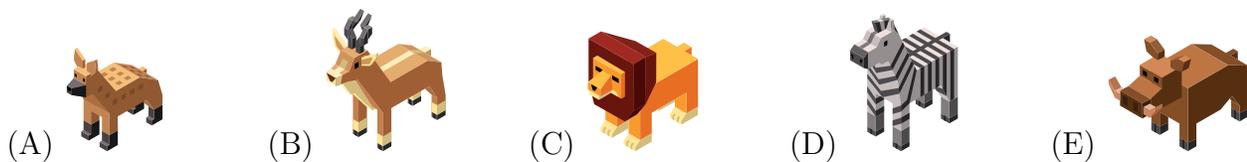
(A) 1   (B) 2   (C) 3   (D) 4   (E) 6

SAMPLE QUESTION FOR 5 POINTS

Charles has 5 wooden toys, as shown in the picture.

6 g   8 g   10 g   11 g   12 g

He picks 2 pairs of toys so that the pairs weigh the same. Which toy was not picked?

(A)

(B)

(C)

(D)

(E)

GRADES 1 AND 2 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

On Michael's toy shelf, there are no turtles, no rabbits, and no robots. Which of these shelves could be Michael's shelf?

(A)

(B)

(C)

(D)

(E)

SAMPLE QUESTION FOR 4 POINTS

There were 12 pieces of fruit on the table. Vera removed 2 pears, 4 apples, and half of the oranges. Now there are only oranges left on the table. How many oranges are left?

(A) 1   (B) 2   **(C) 3**   (D) 4   (E) 6

SAMPLE QUESTION FOR 5 POINTS
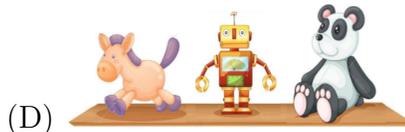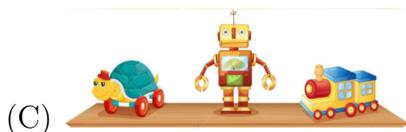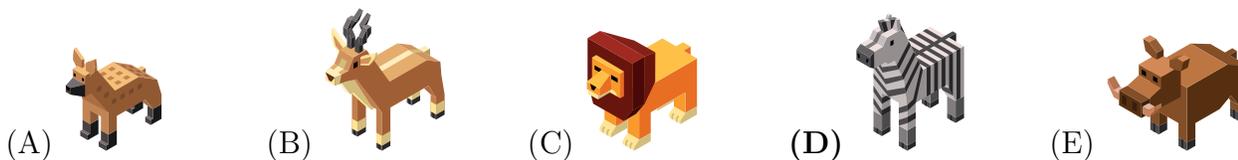
Charles has 5 wooden toys, as shown in the picture.

6 g   8 g   10 g   11 g   12 g

He picks 2 pairs of toys so that the pairs weigh the same. Which toy was not picked?

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

GRADES 3 AND 4

SAMPLE QUESTION FOR 3 POINTS

Arya writes the four digits 2, 0, 2, 5 in the four boxes.

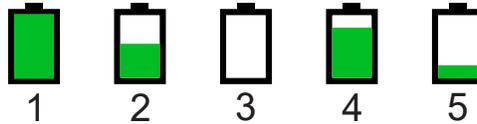$$\square + \square - \square + \square$$

Which order would give her the largest result?

(A) 0, 2, 2, 5   (B) 0, 5, 2, 2   (C) 2, 5, 2, 0   (D) 5, 0, 2, 2   (E) 5, 2, 0, 2
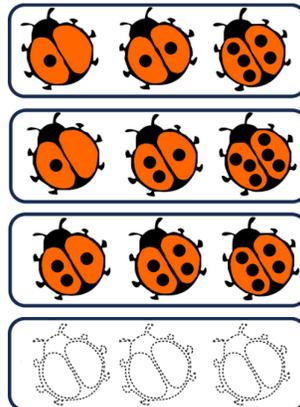
SAMPLE QUESTION FOR 4 POINTS

In the morning, 5 friends had identical fully-charged mobile phones. By the evening, Bob had spoken on the phone as much as Ann and Cristina together. Bob ran out of power. David had not used his phone at all. Which phone belonged to Edward?

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

SAMPLE QUESTION FOR 5 POINTS

Six ladybugs have 1, 2, 3, 4, 5, or 6 spots each. Marta took four photos of them in groups of three. Each ladybug appeared the same number of times in the photos. Three of the photos, along with the outline of the fourth photo, are shown here. How many spots do the three ladybugs in Marta's fourth photo have in total?

(A) 9   (B) 10   (C) 11   (D) 12   (E) 23

GRADES 3 AND 4 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

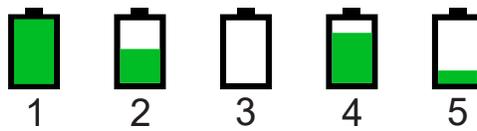Arya writes the four digits 2, 0, 2, 5 in the four boxes.

$$\square + \square - \square + \square$$

Which order would give her the largest result?

(A) 0, 2, 2, 5   (B) 0, 5, 2, 2   (C) 2, 5, 2, 0   (D) 5, 0, 2, 2   **(E) 5, 2, 0, 2**
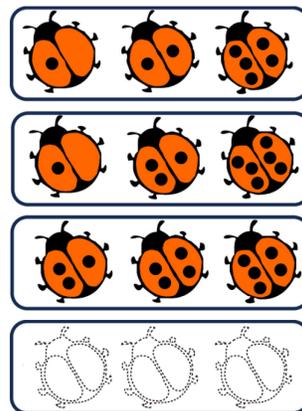
SAMPLE QUESTION FOR 4 POINTS

In the morning, 5 friends had identical fully-charged mobile phones. By the evening, Bob had spoken on the phone as much as Ann and Cristina together. Bob ran out of power. David had not used his phone at all. Which phone belonged to Edward?

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

SAMPLE QUESTION FOR 5 POINTS

Six ladybugs have 1, 2, 3, 4, 5, or 6 spots each. Marta took four photos of them in groups of three. Each ladybug appeared the same number of times in the photos. Three of the photos, along with the outline of the fourth photo, are shown here. How many spots do the three ladybugs in Marta's fourth photo have in total?
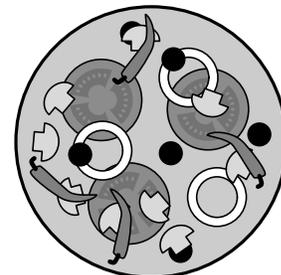

(A) 9   (B) 10   (C) 11   **(D) 12**   (E) 23

GRADES 5 AND 6

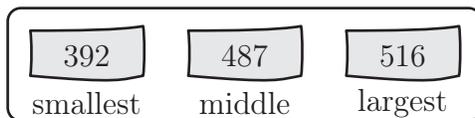## SAMPLE QUESTION FOR 3 POINTS

Max put slices of tomato, black olives, chilies, mushrooms, and onion rings on top of a pizza, but not necessarily in that order. He only put one ingredient at a time. His finished pizza is shown in the picture. Which was the third topping he put on the pizza?

(A) tomato slices
(B) black olives
(C) chilies
(D) mushrooms
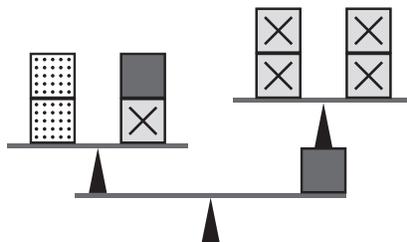(E) onion rings

SAMPLE QUESTION FOR 4 POINTS

Mary and Paul each wrote down three 3-digit numbers using the digits 1 to 9 exactly once. (The picture shows an example of how three 3-digit numbers can be written using the digits 1 to 9 exactly once.) Then Mary and Paul ordered their numbers as smallest, middle, and largest. Mary wrote down the largest possible value the middle number could have. Paul wrote down the smallest possible value the middle number could have. What is the difference between their two middle numbers?

392	487	516
smallest	middle	largest

(A) 642   (B) 684   (C) 864   (D) 888
(E) None of the above.

SAMPLE QUESTION FOR 5 POINTS

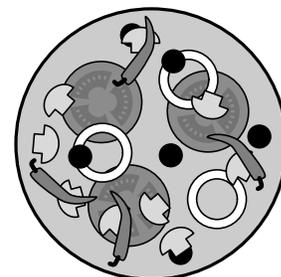Some blocks are balanced on top of each other as shown. Blocks that are shaded in the same way have the same weight.

Ville wants to order the three different types of square blocks from heaviest to lightest. What order should Ville obtain?

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

GRADES 5 AND 6 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

Max put slices of tomato, black olives, chilies, mushrooms, and onion rings on top of a pizza, but not necessarily in that order. He only put one ingredient at a time. His finished pizza is shown in the picture. Which was the third topping he put on the pizza?

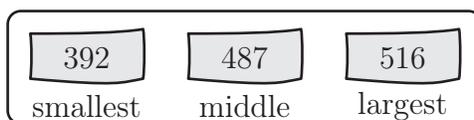(A) tomato slices
(B) black olives ●
(C) chilies
(D) mushrooms
(E) onion rings

SAMPLE QUESTION FOR 4 POINTS

Mary and Paul each wrote down three 3-digit numbers using the digits 1 to 9 exactly once. (The picture shows an example of how three 3-digit numbers can be written using the digits 1 to 9 exactly once.) Then Mary and Paul ordered their numbers as smallest, middle, and largest. Mary wrote down the largest possible value the middle number could have. Paul wrote down the smallest possible value the middle number could have. What is the difference between their two middle numbers?

| 392 | 487 | 516 |
| smallest | middle | largest |

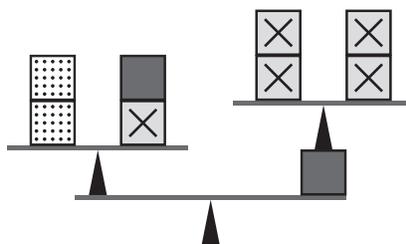**(A) 642**   (B) 684   (C) 864   (D) 888
(E) None of the above.

SAMPLE QUESTION FOR 5 POINTS

Some blocks are balanced on top of each other as shown. Blocks that are shaded in the same way have the same weight.

Ville wants to order the three different types of square blocks from heaviest to lightest. What order should Ville obtain?
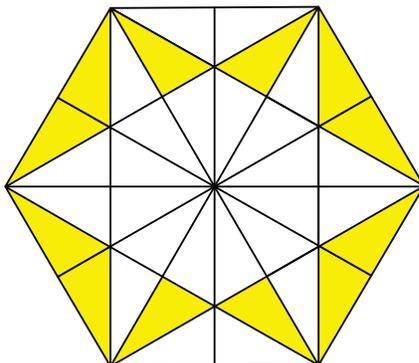
(A)   (B)   (C)   (D)   (E)

GRADES 7 AND 8

SAMPLE QUESTION FOR 3 POINTS

The regular hexagon shown is divided into many triangles of equal area. What fraction of the hexagon is shaded?
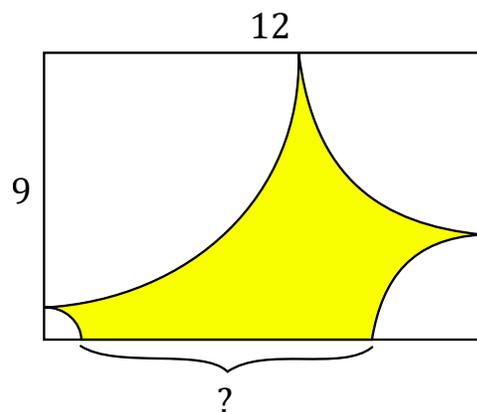

(A) $\dfrac{1}{2}$ (B) $\dfrac{1}{3}$ (C) $\dfrac{1}{4}$ (D) $\dfrac{1}{5}$ (E) $\dfrac{1}{6}$

SAMPLE QUESTION FOR 4 POINTS

Peter drew a quarter circle with center at each corner of a flag with dimensions 12 cm by 9 cm and colored the region formed, as shown. What is the length indicated by the question mark?

(A) 5 cm   (B) 6 cm   (C) 7 cm
(D) 8 cm   (E) 9 cm
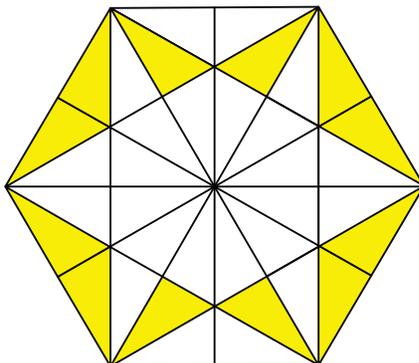

SAMPLE QUESTION FOR 5 POINTS

Some birds, including Ha, Long, Nha, and Trang, are perching on four parallel wires. There are 10 birds perched above Ha. There are 25 birds perched above Long. There are five birds perched below Nha. There are two birds perched below Trang. The number of birds perched above Trang is a multiple of the number of birds perched below her. How many birds in total are perched on the four wires?

(A) 27   (B) 30   (C) 32   (D) 37   (E) 40

GRADES 7 AND 8 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

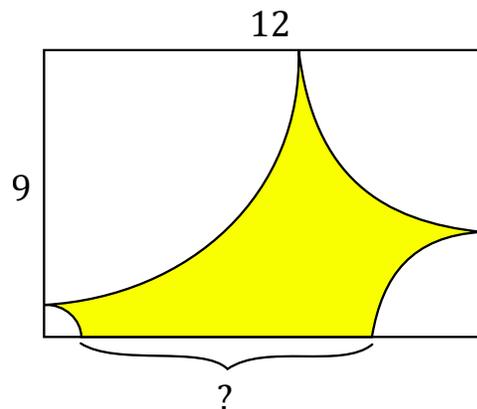The regular hexagon shown is divided into many triangles of equal area. What fraction of the hexagon is shaded?

(A) $\dfrac{1}{2}$ **(B)** $\dfrac{1}{3}$ (C) $\dfrac{1}{4}$ (D) $\dfrac{1}{5}$ (E) $\dfrac{1}{6}$

SAMPLE QUESTION FOR 4 POINTS

Peter drew a quarter circle with center at each corner of a flag with dimensions 12 cm by 9 cm and colored the region formed, as shown. What is the length indicated by the question mark?

(A) 5 cm   **(B) 6 cm**   (C) 7 cm
(D) 8 cm   (E) 9 cm

SAMPLE QUESTION FOR 5 POINTS

Some birds, including Ha, Long, Nha, and Trang, are perching on four parallel wires. There are 10 birds perched above Ha. There are 25 birds perched above Long. There are five birds perched below Nha. There are two birds perched below Trang. The number of birds perched above Trang is a multiple of the number of birds perched below her. How many birds in total are perched on the four wires?

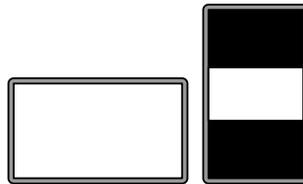**(A) 27**   (B) 30   (C) 32   (D) 37   (E) 40

GRADES 9 AND 10

SAMPLE QUESTION FOR 3 POINTS

The 4-digit number 80□□ is missing its last two digits. The number is divisible by 8 and 9. What is the product of these two missing digits?

(A) 6   (B) 16   (C) 20   (D) 24   (E) 48
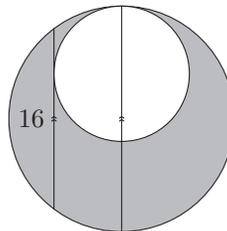
SAMPLE QUESTION FOR 4 POINTS

Anna looks at a photo on her smartphone. The format is 16 : 9 and fills the whole display. When she turns the smartphone, the picture gets smaller. What fraction of the display area is taken up by the smaller picture?

(A) $\dfrac{3}{4}$ (B) $\dfrac{9}{16}$ (C) $\dfrac{27}{64}$ (D) $\dfrac{32}{81}$ (E) $\dfrac{81}{256}$

SAMPLE QUESTION FOR 5 POINTS

In the diagram below, the diameter of the inner circle forms part of the diameter of the outer circle. The outer circle has a chord of length 16 that is parallel to its diameter and is also a tangent to the inner circle. What is the area of the shaded region?

(A) 36π (B) 49π (C) 64π (D) 81π

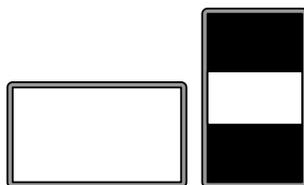(E) The information provided is not sufficient.

GRADES 9 AND 10 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

The 4-digit number 80□□ is missing its last two digits. The number is divisible by 8 and 9. What is the product of these two missing digits?

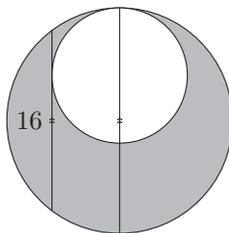(A) 6 (B) 16 (C) 20 **(D) 24** (E) 48

SAMPLE QUESTION FOR 4 POINTS

Anna looks at a photo on her smartphone. The format is 16 : 9 and fills the whole display. When she turns the smartphone, the picture gets smaller. What fraction of the display area is taken up by the smaller picture?

(A) $\dfrac{3}{4}$ (B) $\dfrac{9}{16}$ (C) $\dfrac{27}{64}$ (D) $\dfrac{32}{81}$ **(E)** $\dfrac{81}{256}$

SAMPLE QUESTION FOR 5 POINTS

In the diagram below, the diameter of the inner circle forms part of the diameter of the outer circle. The outer circle has a chord of length 16 that is parallel to its diameter and is also a tangent to the inner circle. What is the area of the shaded region?

(A) 36π (B) 49π **(C) 64π** (D) 81π
(E) The information provided is not sufficient.
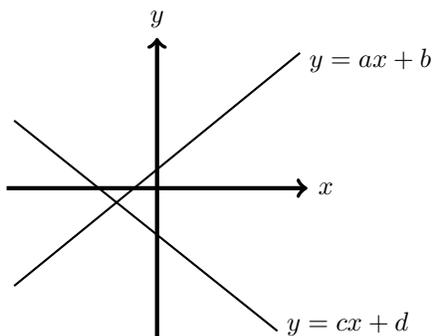
GRADES 11 AND 12

SAMPLE QUESTION FOR 3 POINTS

Mike obtains a number x by dividing the number $\sqrt{11}$ by 3. Where is the number x to be found on the number line?

(A) between 0 and 1   (B) between 1 and 2   (C) between 2 and 3
(D) between 3 and 4   (E) between 4 and 5

SAMPLE QUESTION FOR 4 POINTS

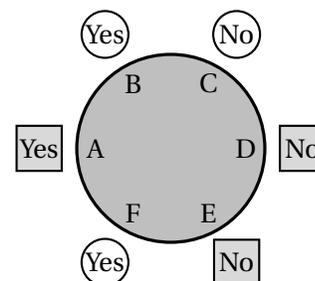A student drew the graphs of two linear functions in a coordinate system, as shown.

The expression $ab + cd - (ac + bd)$ is always

(A) negative.   (B) non-positive.   (C) positive.   (D) zero.
(E) None of the above is always true.

SAMPLE QUESTION FOR 5 POINTS

A group of three square men from Mars and a group of three circular men from Jupiter are sitting around a table, as shown. One of the six has the key to their flying saucer. All members of one group always tell the truth and all members of the other group always lie. All six were asked the question, "Does a person sitting next to you have the key?" Their answers are shown in the figure. Who has the key?

(A) A   (B) B   (C) C   (D) D   (E) E
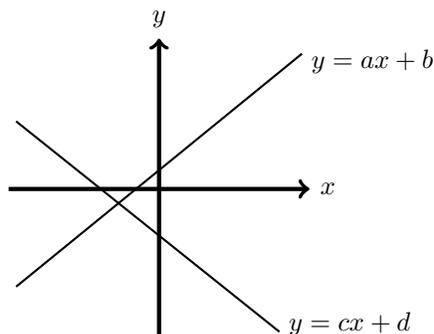
GRADES 11 AND 12 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

Mike obtains a number x by dividing the number $\sqrt{11}$ by 3. Where is the number x to be found on the number line?

    (A) between 0 and 1   **(B) between 1 and 2**   (C) between 2 and 3
    (D) between 3 and 4   (E) between 4 and 5

SAMPLE QUESTION FOR 4 POINTS

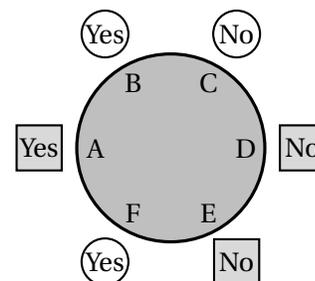A student drew the graphs of two linear functions in a coordinate system, as shown.

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