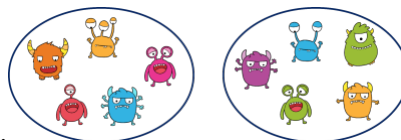


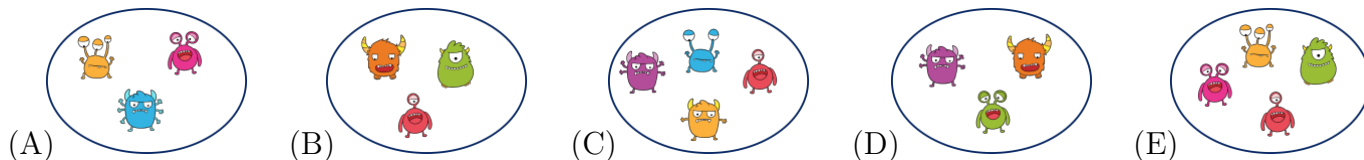
GRADES 1 AND 2

SAMPLE QUESTION FOR 3 POINTS



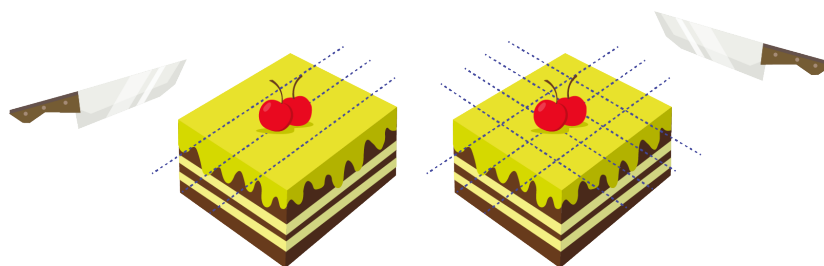
The picture shows 2 different families of monsters.

Which of the groups below is made up of monsters from the same family?



SAMPLE QUESTION FOR 4 POINTS

Grandma divides a cake with 3 cuts. Then she turns the cake and makes 4 more cuts, as shown in the picture.



How many pieces of cake are there now?

- (A) 14
- (B) 16
- (C) 18
- (D) 20
- (E) 21

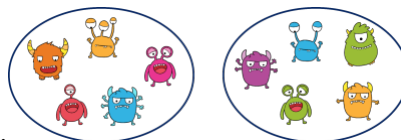
SAMPLE QUESTION FOR 5 POINTS

A cat in Istanbul has 7 kittens. One male kitten's name is Albert, and one female kitten's name is Stella. Stella has twice as many brothers as Albert. How many sisters does Stella have?

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

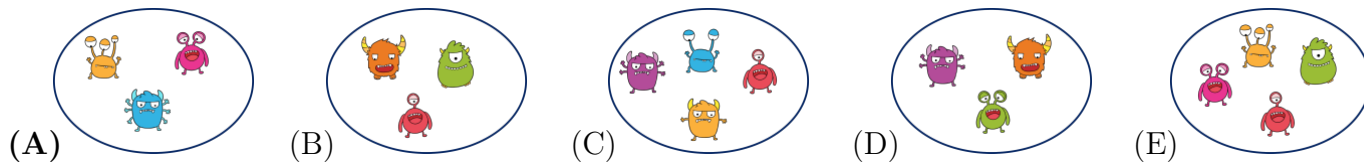
GRADES 1 AND 2 ANSWERS

SAMPLE QUESTION FOR 3 POINTS



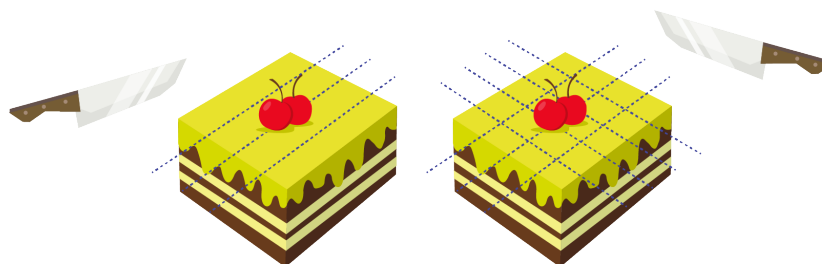
The picture shows 2 different families of monsters.

Which of the groups below is made up of monsters from the same family?



SAMPLE QUESTION FOR 4 POINTS

Grandma divides a cake with 3 cuts. Then she turns the cake and makes 4 more cuts, as shown in the picture.



How many pieces of cake are there now?

- (A) 14 (B) 16 (C) 18 (D) 20 (E) 21

SAMPLE QUESTION FOR 5 POINTS

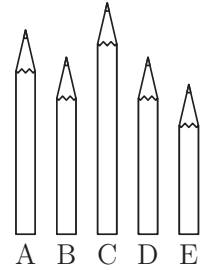
A cat in Istanbul has 7 kittens. One male kitten’s name is Albert, and one female kitten’s name is Stella. Stella has twice as many brothers as Albert. How many sisters does Stella have?

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

GRADES 3 AND 4

SAMPLE QUESTION FOR 3 POINTS

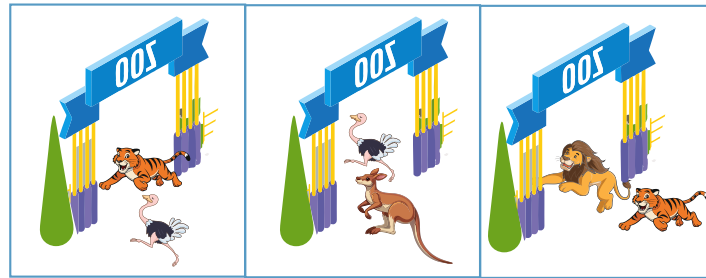
Finn has 5 pencils. The shortest one is blue. The green and red pencils are the same length. The purple pencil is shorter than the yellow one. Which pencil is the purple one?



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

SAMPLE QUESTION FOR 4 POINTS

The three photographs show a tiger, a kangaroo, a lion, and an ostrich escaping from the zoo.

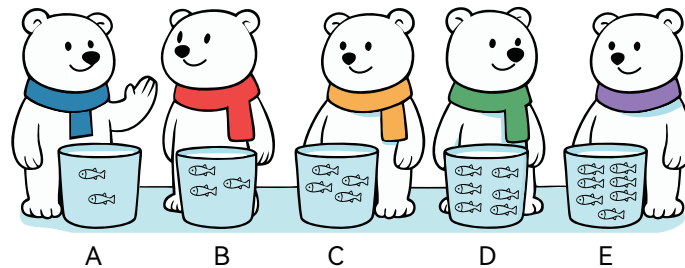


In what order did they escape through the gate?

- (A) lion, ostrich, tiger, kangaroo (B) lion, tiger, ostrich, kangaroo
 (C) tiger, ostrich, kangaroo, lion (D) ostrich, kangaroo, lion, tiger
 (E) tiger, kangaroo, lion, ostrich

SAMPLE QUESTION FOR 5 POINTS

Five polar bears – Karen, Lisa, Marieke, Nadja, and Peter – each keep the fish they catch in a bucket. Karen tells Lisa, “Give me 2 fish, and then we will have the same number of fish.” Marieke tells Karen and Lisa, “I have half as many fish as the two of you have together.” Which bucket belongs to Lisa?

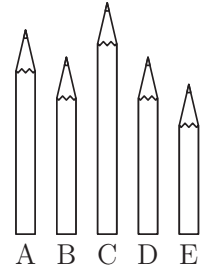


- (A) A (B) B (C) C (D) D (E) E

GRADES 3 AND 4 ANSWERS





SAMPLE QUESTION FOR 3 POINTS

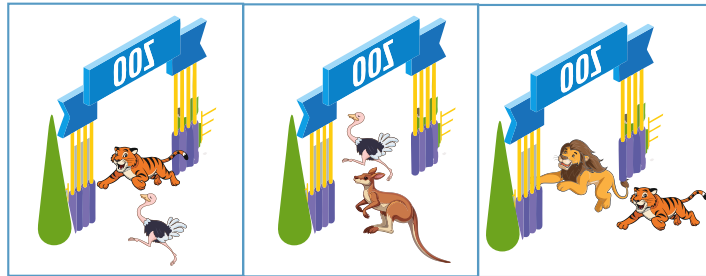
Finn has 5 pencils. The shortest one is blue. The green and red pencils are the same length. The purple pencil is shorter than the yellow one. Which pencil is the purple one?



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

SAMPLE QUESTION FOR 4 POINTS

The three photographs show a tiger , a kangaroo , a lion , and an ostrich  escaping from the zoo.

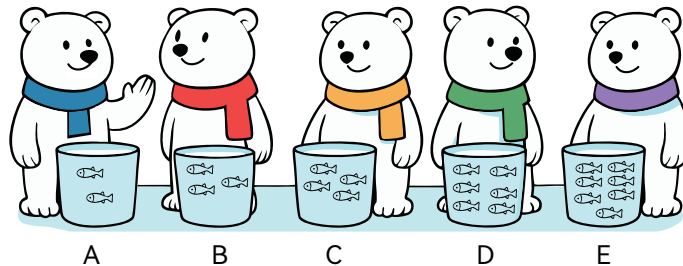


In what order did they escape through the gate?

- (A) lion, ostrich, tiger, kangaroo (B) lion, tiger, ostrich, kangaroo
 (C) tiger, ostrich, kangaroo, lion (D) ostrich, kangaroo, lion, tiger
 (E) tiger, kangaroo, lion, ostrich

SAMPLE QUESTION FOR 5 POINTS

Five polar bears – Karen, Lisa, Marieke, Nadja, and Peter – each keep the fish they catch in a bucket. Karen tells Lisa, “Give me 2 fish, and then we will have the same number of fish.” Marieke tells Karen and Lisa, “I have half as many fish as the two of you have together.” Which bucket belongs to Lisa?

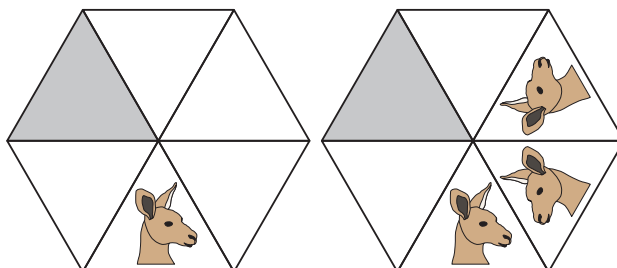


- (A) A (B) B (C) C (D) D (E) E

GRADES 5 AND 6

SAMPLE QUESTION FOR 3 POINTS

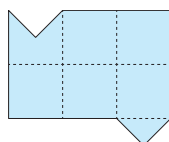
The first figure shows a kangaroo's face. The second figure shows the result after reflecting the kangaroo across the figure's lines twice. If this process continues until all the triangles are filled, what will the kangaroo look like in the shaded triangle?



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

SAMPLE QUESTION FOR 4 POINTS

Which option shows a cut that divides the figure shown into two identical parts? The parts may be flipped.



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

SAMPLE QUESTION FOR 5 POINTS

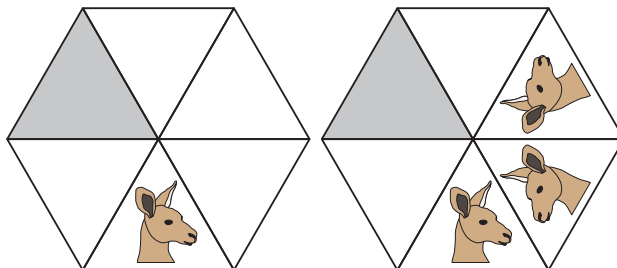
The five cups shown belong to Leonard, Rajesh, Amy, Penny, and Sheldon, in some order. Each cup's handle is either black or white. Leonard's cup and Rajesh's cup are the same size, but their handles are different colors. Amy's cup and Penny's cup are different sizes, but their handles are the same color. Which cup belongs to Sheldon?

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

GRADES 5 AND 6 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

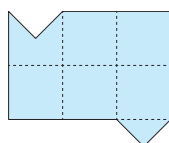
The first figure shows a kangaroo's face. The second figure shows the result after reflecting the kangaroo across the figure's lines twice. If this process continues until all the triangles are filled, what will the kangaroo look like in the shaded triangle?



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

SAMPLE QUESTION FOR 4 POINTS

Which option shows a cut that divides the figure shown into two identical parts? The parts may be flipped.



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

SAMPLE QUESTION FOR 5 POINTS

The five cups shown belong to Leonard, Rajesh, Amy, Penny, and Sheldon, in some order. Each cup's handle is either black or white. Leonard's cup and Rajesh's cup are the same size, but their handles are different colors. Amy's cup and Penny's cup are different sizes, but their handles are the same color. Which cup belongs to Sheldon?

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

GRADES 7 AND 8

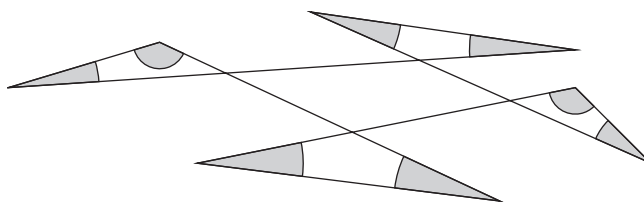
SAMPLE QUESTION FOR 3 POINTS

Jo wants to place the numbers 2, 0, 2, and 6 into the four boxes, with one number in each box, to form the expression $\frac{\square + \square}{\square - \square}$. When she calculates the result, what is the smallest **positive** value she can obtain?

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

SAMPLE QUESTION FOR 4 POINTS





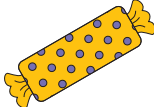
What is the sum of the measures of all the shaded angles?



- (A) 180° (B) 240° (C) 270° (D) 360° (E) 450°

SAMPLE QUESTION FOR 5 POINTS

Anna, Elsa, and their mother are playing a reasoning game. Their mother chooses one of the pieces of candy from the options shown. She tells Anna the pattern on the wrapper and tells Elsa the shape of the candy. Then she asks, “Do you know which piece of candy I chose?” Both Anna and Elsa answer, “No.” She asks the same question a second time, and again both answer, “No.” When she asks a third time, both Anna and Elsa answer correctly at the same time. Which piece of candy did the mother choose?

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

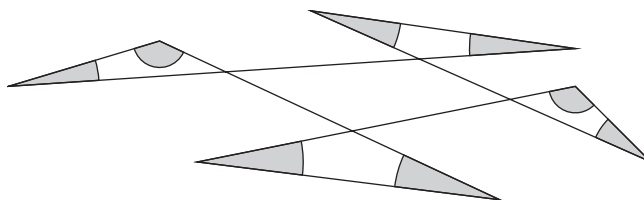
GRADES 7 AND 8 ANSWERS

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

SAMPLE QUESTION FOR 4 POINTS

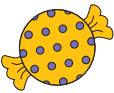
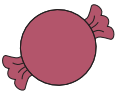


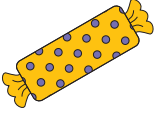
What is the sum of the measures of all the shaded angles?



- (A) 180° (B) 240° (C) 270° (D) 360° (E) 450°

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Anna, Elsa, and their mother are playing a reasoning game. Their mother chooses one of the pieces of candy from the options shown. She tells Anna the pattern on the wrapper and tells Elsa the shape of the candy. Then she asks, “Do you know which piece of candy I chose?” Both Anna and Elsa answer, “No.” She asks the same question a second time, and again both answer, “No.” When she asks a third time, both Anna and Elsa answer correctly at the same time. Which piece of candy did the mother choose?

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

GRADES 9 AND 10

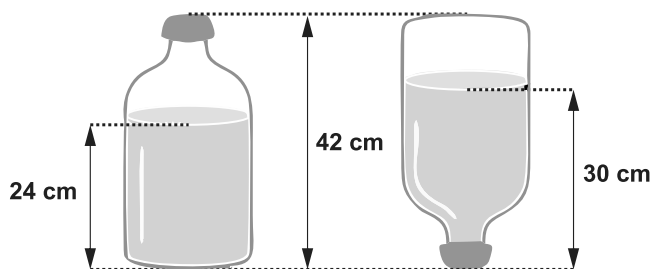
SAMPLE QUESTION FOR 3 POINTS

The number of the year 2026 has the following two properties: Exactly two of its four digits are equal and the sum of its digits is 10. How many years in the 21st century have both of these same properties?

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

SAMPLE QUESTION FOR 4 POINTS

The diagram shows how the depth of water in a bottle changes when it is flipped upside down. The bottle's capacity is 4.5 liters and the entire water-filled part in the first diagram is cylindrical in shape. What is the volume of water, in liters, in the bottle?



- (A) 2.4 (B) 2.5 (C) 2.7 (D) 3.0 (E) 3.5

SAMPLE QUESTION FOR 5 POINTS

Charles and Paul alternate in taking toffees out of a box: Charles takes 1, then Paul takes 2, then Charles takes 3, then Paul takes 4, and so on. When there are not enough toffees to follow this pattern, the boy whose turn it is takes all of the remaining ones. At the end, Charles has 407 toffees. How many toffees were in the box at the beginning?

- (A) 814 (B) 827 (C) 834 (D) 841 (E) 851

GRADES 9 AND 10 ANSWERS

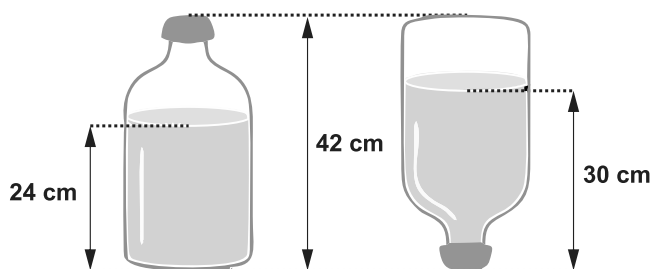
SAMPLE QUESTION FOR 3 POINTS

The number of the year 2026 has the following two properties: Exactly two of its four digits are equal and the sum of its digits is 10. How many years in the 21st century have both of these same properties?

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SAMPLE QUESTION FOR 5 POINTS

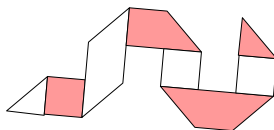
Charles and Paul alternate in taking toffees out of a box: Charles takes 1, then Paul takes 2, then Charles takes 3, then Paul takes 4, and so on. When there are not enough toffees to follow this pattern, the boy whose turn it is takes all of the remaining ones. At the end, Charles has 407 toffees. How many toffees were in the box at the beginning?

- (A) 814 (B) 827 (C) 834 (D) 841 (E) 851

GRADES 11 AND 12

SAMPLE QUESTION FOR 3 POINTS

Ali made seven folds in a strip of paper with a white side and a dark side, as seen in the figure. He then unfolded the paper. What does the white side of the paper look like after unfolding?



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

SAMPLE QUESTION FOR 4 POINTS

Two points P and Q are randomly placed on a line segment AB , with neither at the mid-point.



What is the probability that the line segment PQ contains the mid-point of AB ?

- (A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{3}{4}$

SAMPLE QUESTION FOR 5 POINTS

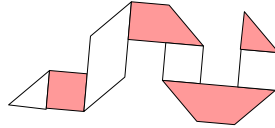
For a number $x > 0$ define $\sqrt[3]{x}$, the *triangular root* of x , to be the value $s > 0$ such that $\frac{s(s+1)}{2} = x$. Which of the following is always equal to $\sqrt[3]{4x - \sqrt[3]{x}}$?

- (A) $2\sqrt[3]{x}$ (B) $4\sqrt[3]{x} - 1$ (C) $3\sqrt[3]{x}$ (D) $\sqrt[3]{x^2 + x}$ (E) $\sqrt[3]{x} + 1$

GRADES 11 AND 12 ANSWERS

SAMPLE QUESTION FOR 3 POINTS

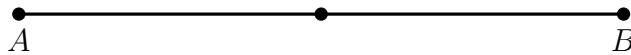
Ali made seven folds in a strip of paper with a white side and a dark side, as seen in the figure. He then unfolded the paper. What does the white side of the paper look like after unfolding?



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

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Two points P and Q are randomly placed on a line segment AB , with neither at the mid-point.



What is the probability that the line segment PQ contains the mid-point of AB ?

- (A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{3}{4}$

SAMPLE QUESTION FOR 5 POINTS

For a number $x > 0$ define $\sqrt[3]{x}$, the *triangular root* of x , to be the value $s > 0$ such that $\frac{s(s+1)}{2} = x$.

Which of the following is always equal to $\sqrt[3]{4x - \sqrt[3]{x}}$?

- (A) $2\sqrt[3]{x}$ (B) $4\sqrt[3]{x} - 1$ (C) $3\sqrt[3]{x}$ (D) $\sqrt[3]{x^2 + x}$ (E) $\sqrt[3]{x} + 1$