

Put the numbers 1, 2, 3, 4, 5 in the boxes so that everything is correct.

$$\begin{array}{r} 2 \\ 1 \end{array} \begin{array}{r} 4 \\ 5 \\ 3 \end{array}$$
$$\begin{array}{c} \square + \square \\ \downarrow \\ \square - \square \\ \downarrow \\ \square \end{array}$$

Which number goes into the box marked with the question mark?

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

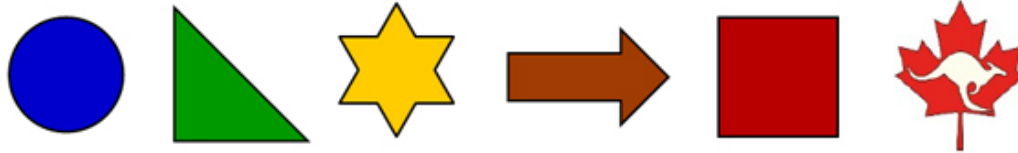
Grade 2. 5 points

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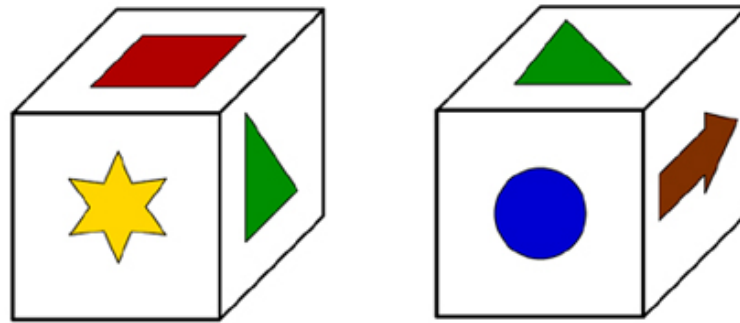
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The following six shapes were drawn on the six walls of a cube:



Below is what you see if looking at this cube from two positions.



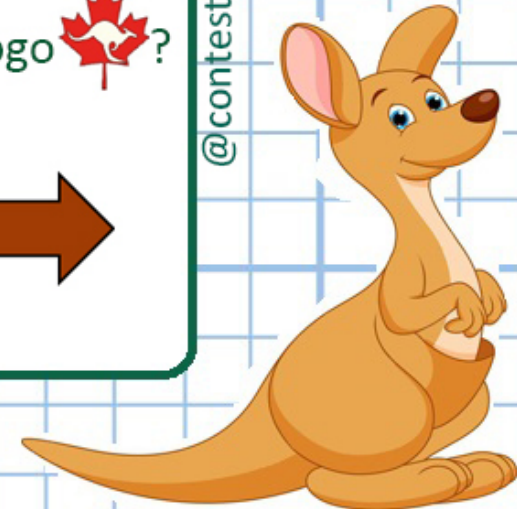
Which shape is opposite to the Canadian Math Kangaroo logo ?

- A)  B)  C)  D)  E) 

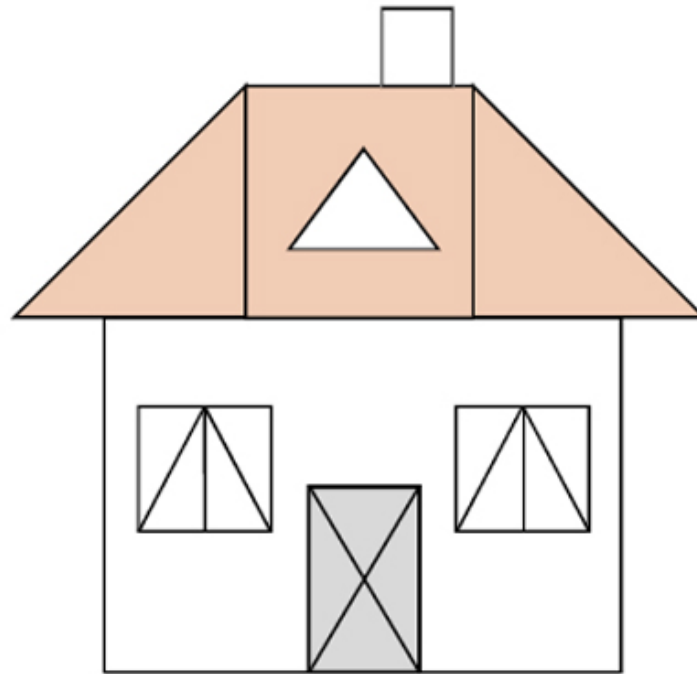
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How many triangles are there in the picture?

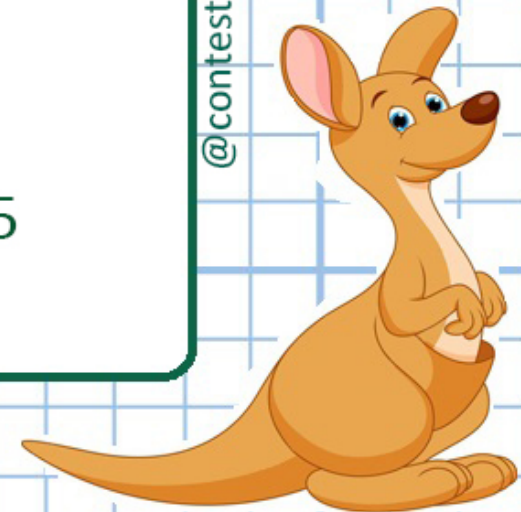


- A) 15 B) 17 C) 19 D) 21 E) 25

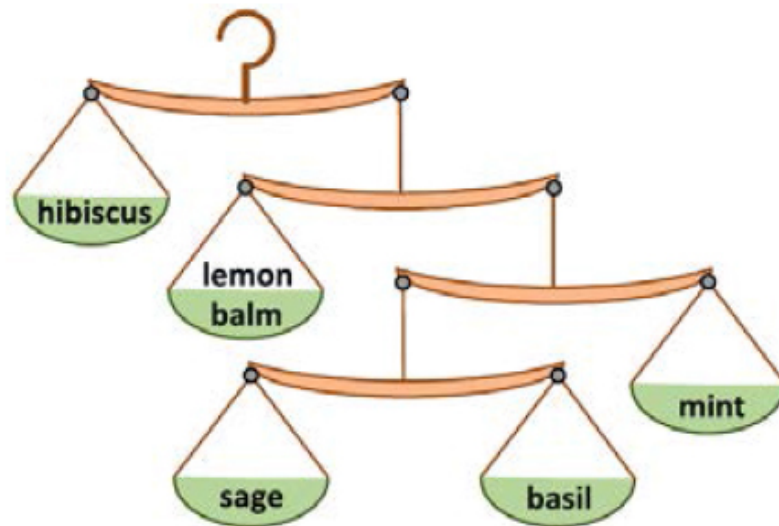
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To cook an elixir a witch needs five types of herbs exactly in the amounts weighed by the scales in the picture. The witch knows that she needs to put 5 grams of sage into the elixir. How many grams of hibiscus does she have to use? (The weight of the scales is irrelevant.)

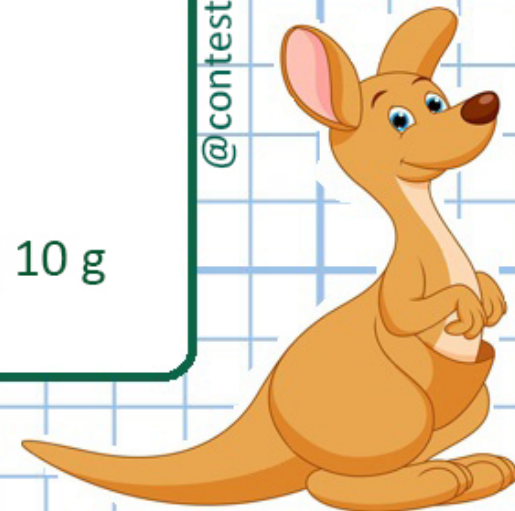


- A) 50 g B) 40 g C) 30 g D) 20 g E) 10 g

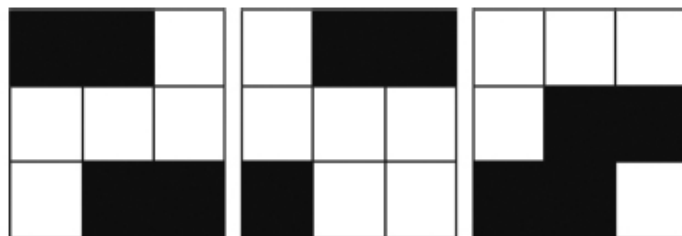
Grade 3-4. 5 points

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Paige has three transparent sheets with the following opaque black patterns.



She can only rotate the sheets, she cannot flip them over. If Paige rotated the sheets and then put them one on top of the other, what would be the maximum possible number of black squares she could see if looking down on all the sheets?

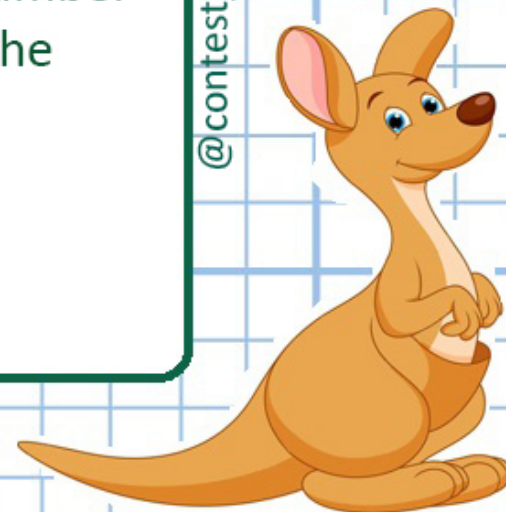
- A) 5 B) 6 C) 7 D) 8 E) 9

Grade 3-4. 5 points

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Four workers are building a house. In five days they built half the house. But winter is coming and they want to finish building the house in two more days. How many friends should the workers call for help, if they do not want to bother more people than is necessary?

A) 2

B) 4

C) 6

D) 7

E) 10

Grade 3-4. 5 points



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Winnie's vinegar-wine-water marinade contains vinegar and wine in the ratio 1 to 2, and wine and water in the ratio 3 to 1. Which of the following statements is true?

- (A) There is more vinegar than wine.
- (B) There is more wine than vinegar and water together.
- (C) There is more vinegar than wine and water together.
- (D) There is more water than vinegar and wine together.
- (E) There is less vinegar than either water or wine.

Grade 5-6. 5 points

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The king and his messengers are travelling from the castle to the summer palace at a speed of 5 km/h.

Along the way, the king sends a messenger back to the castle; and one hour later, he sends back another messenger.

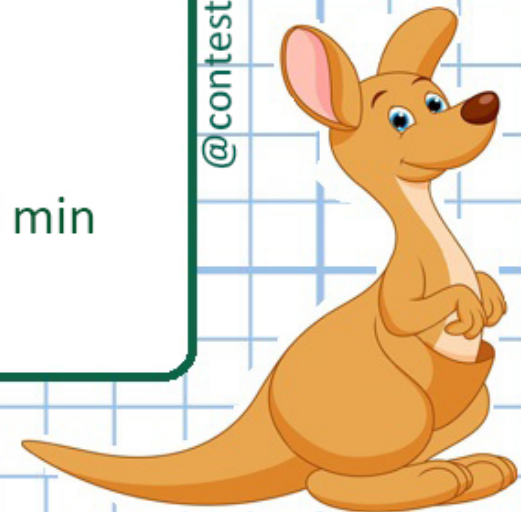
If the messengers travel at a speed of 10 km/h, what is the time between their arrivals at the castle?

- A) 30 min B) 60 min C) 75 min D) 90 min E) 120 min

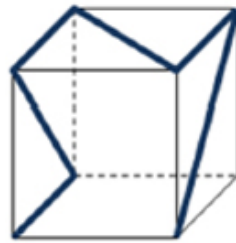
Grade 5-6. 5 points

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



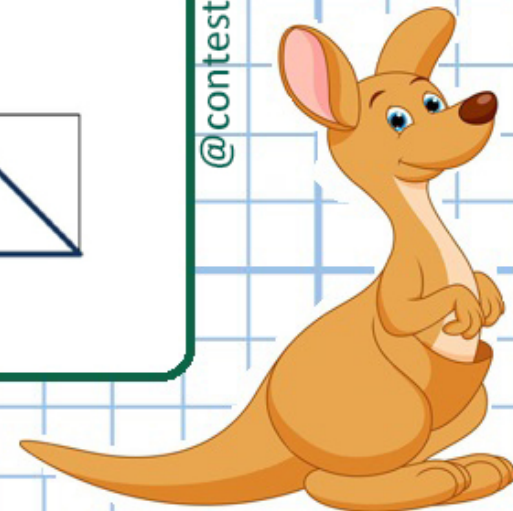
Which of the following pictures does not represent the cube as seen from any perspective?



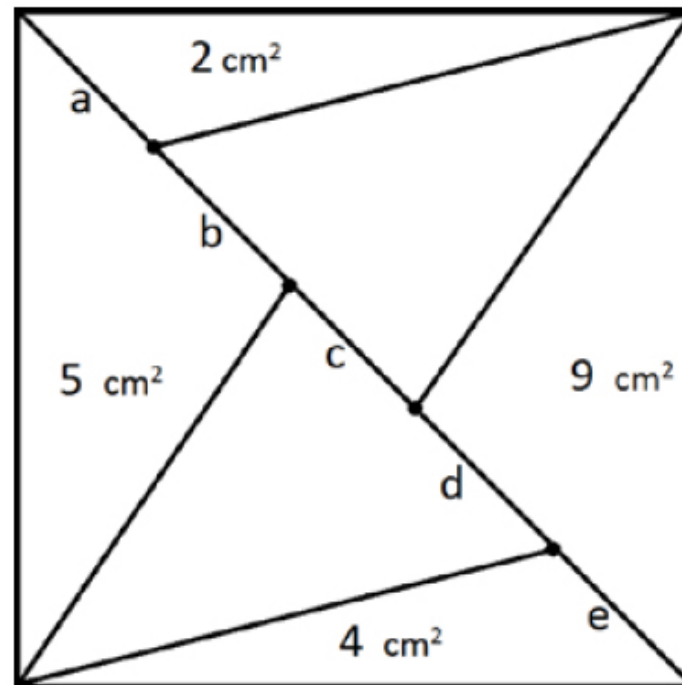
Grade 5-6. 5 points

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A square with area 30 cm^2 is divided in two by a diagonal and then into triangles, as shown. The areas of some of these triangles are given in the figure.



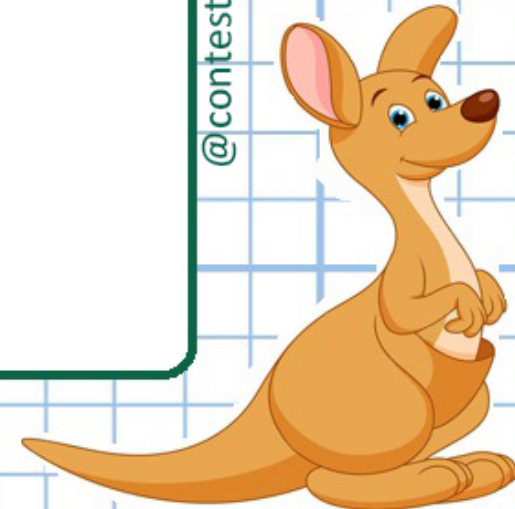
Which part of the diagonal is the longest?

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

Grade 7-8. 5 points

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Several different positive integers are written on the board. Exactly two of them are divisible by 2 and exactly 13 of them are divisible by 13. Let M be the greatest of these numbers. What is the smallest possible value of M ?

- A) 169 B) 260 C) 273 D) 299 E) 325

Grade 7-8. 5 points

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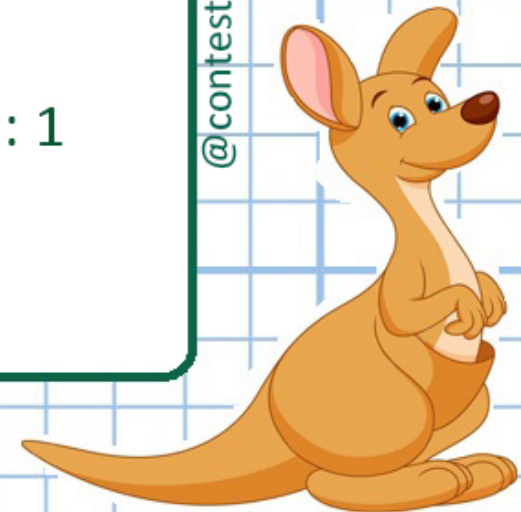
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David rode his bicycle from Edinburgh to his farm. He was going to arrive at 3:00 pm, but he spent $\frac{2}{3}$ of the planned time covering $\frac{3}{4}$ of the distance. After that, he rode more slowly and arrived exactly as expected. What is the ratio of the speed for the first part of the journey to the speed for the second part?

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

Grade 7-8. 5 points

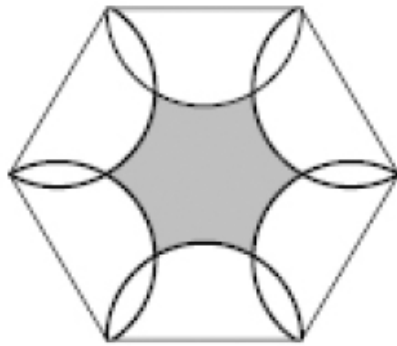


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On each side of a hexagon, as on a diameter a circle is constructed. Given that the length of the side of the hexagon is 1, what is the area of the grey region (i.e. the region that belongs to the hexagon but not to any circle)?



A) $\frac{6 - \pi}{4}$

B) $\frac{3(2\sqrt{3} - \pi)}{4}$

C) $\frac{3\sqrt{3} - \pi}{4}$

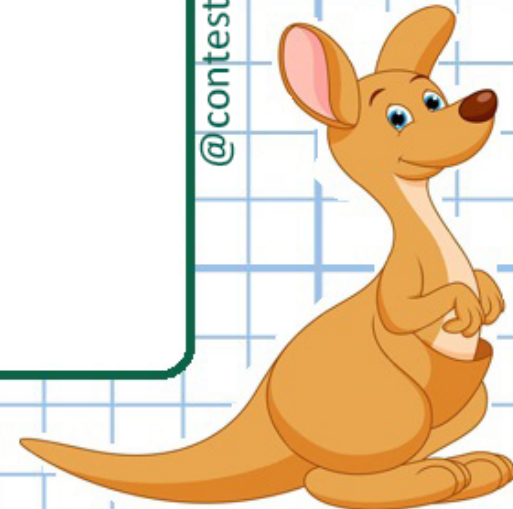
D) $\frac{6\sqrt{3} - \pi}{4}$

E) $\frac{3(3\sqrt{3} - \pi)}{4}$

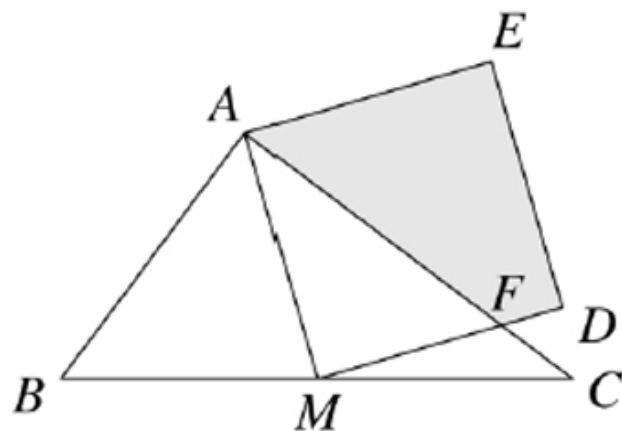
Grade 9-11. 5 points

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



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

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

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

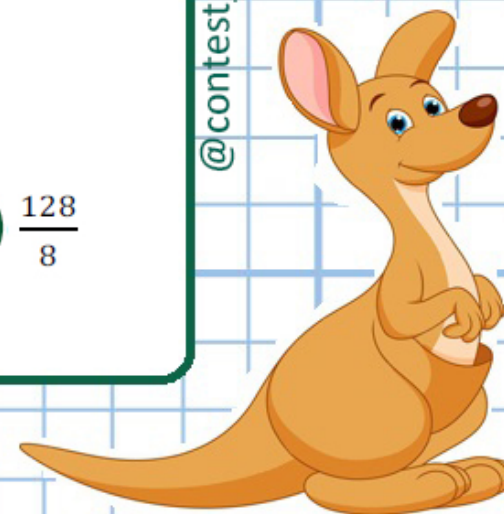
D) $\frac{127}{8}$

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

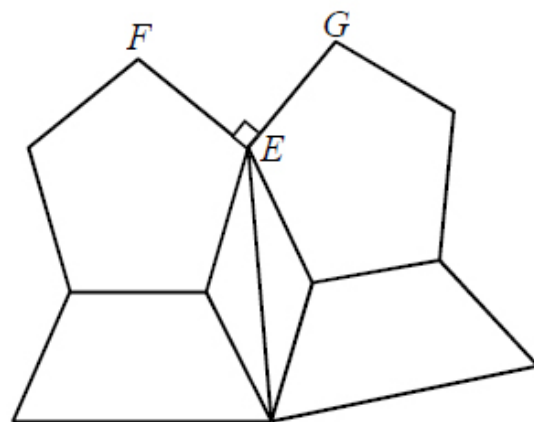
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The dome of Canada's largest church, the Oratory St. Joseph in Montreal, is surrounded by a decorative ring-shaped motif composed of congruent regular pentagons, congruent isosceles triangles, and congruent isosceles trapezoids. The diagram shows a fragment of this motif.



If it is known that the angle FEG is right, how many triangles are there in the entire motif?

- A) 40 B) 36 C) 54 D) 20 E) Not enough information

Grade 9-11. 5 points

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