

In the operations above, the red arrows represent addition and the blue arrows represent multiplication in natural numbers.

Which number should be in the circle with the question mark?

- A) 28 B) 35 C) 60 D) 192

$$3 \times 3 \div 3 - 2 + 2 - 2 \times (1 + 1) \div 1 = ?$$

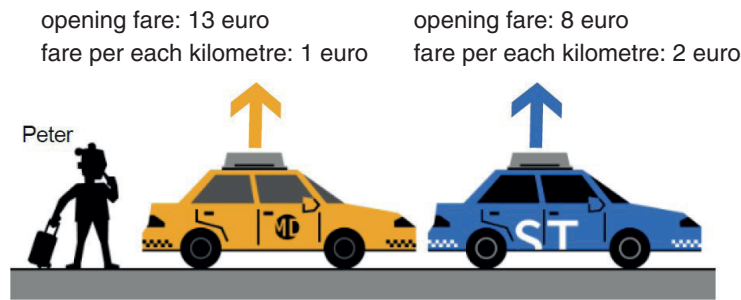
What is the result of the operation above?

- A) -2 B) -1 C) 0 D) 2



Michel's dog is 4 years younger than his cat. If the sum of the ages of the two pets is 18, how old is Michel's cat?

- A) 7 B) 9 C) 11 D) 13



Peter and his friends, who come to Frankfurt for the STEM GRAND FINAL organisation, take two taxis from the airport to the hotel. The taxis they take are from different companies that apply different price lists but when they arrive at the hotel, they notice that the fares for both taxis are the same.

How far is their hotel from the airport?

- A) 3 km B) 4 km C) 5 km D) 6 km

$$\begin{array}{r} \text{S} \text{ S} \\ - \text{T} \text{ T} \\ \hline \text{T} \text{ 3} \end{array} \quad \begin{array}{r} \text{E} \text{ M} \\ + \text{E} \text{ M} \\ \hline 1 \text{ M} \text{ 0} \end{array}$$

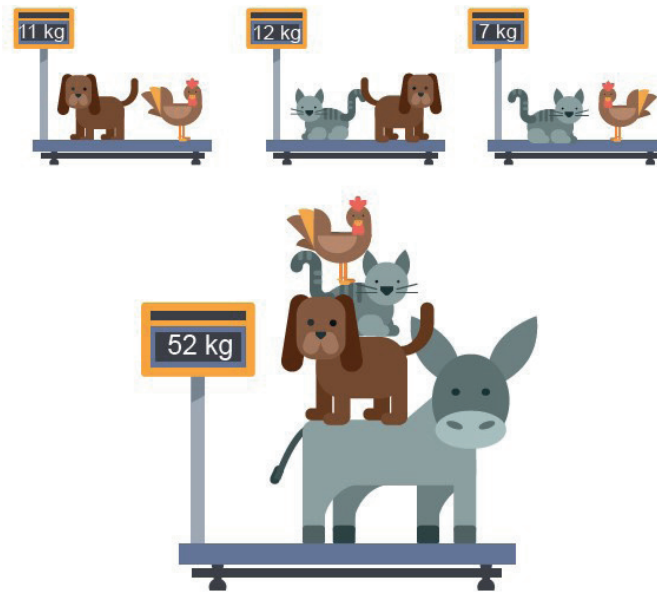
Given that each letter represents a non-zero numeral, what is the result of the operation $(S+T+E+M)$?

- A) 13 B) 17 C) 19 D) 21

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Assuming that positive natural numbers follow the colour pattern given in the table above, what colour is the result of the operation (7×19) ?

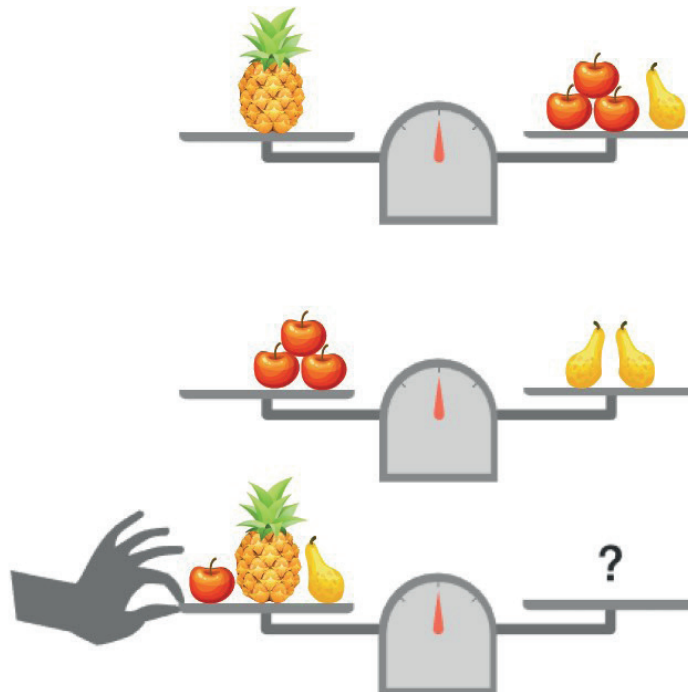
- A) Orange B) Blue
C) Green D) Red



The weights of some pairs of animals of the musicians of Bremen are as shown in the figure.

How much does the donkey weigh?

- A) 25 kg B) 32 kg C) 36 kg D) 37 kg



The first two scales above are in balance. The third scale at the bottom is supported by hand to keep it in balance.

How many apples should be placed on the right pan of the third scale so that it still remains in balance after letting it go?

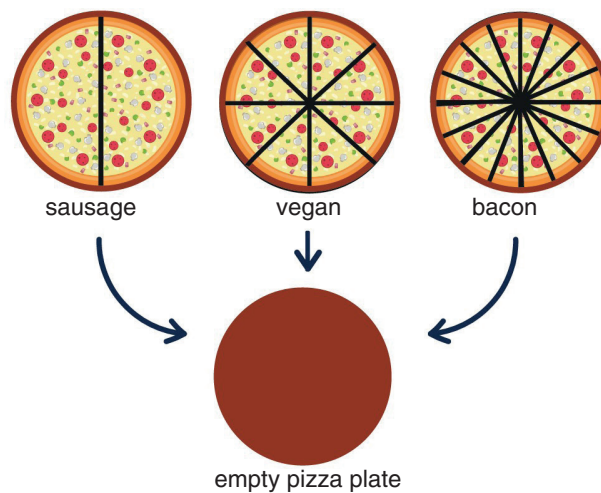
- A) 6 B) 7 C) 8 D) 9



There are 16 bikes for sale in a shop that sells bicycles and tricycles.

Given that the total number of wheels of the bikes in the shop is 44, how many bicycles are there in the shop?

- A) 4 B) 5 C) 6 D) 7



Tina, who works at the pizzeria, takes a slice of pizza from each pizza plate above, and places them neatly on the empty plate to prepare the mixed pizza delivery.

Which of the pizza slices given in the options makes the delivery plate full?

- A) One slice of vegan, one slice of bacon pizza
 B) Two slices of vegan, two slices of bacon pizza
 C) One slice of vegan, three slices of bacon pizza
 D) Three slices of vegan pizza



Canadian group



French group



On the 4th day of the STEM GRAND FINAL there was a day trip to the Phantasialand entertainment centre. At lunch time, students from France and Canada groups bought equal sized chocolate bars with different sized pieces as shown above. Eto and Kate from the Canada group ate 8 and 14 pieces of chocolate respectively, while Pierre and Vanessa from the France group ate 6 and 10 pieces of chocolate.

Which of the following options gives the correct order of these four students from the least chocolate eater to the most chocolate eater?

- A) Eto-Pierre-Kate-Vanessa
- B) Pierre-Eto-Kate-Vanessa
- C) Pierre-Eto-Vanessa-Kate
- D) Eto-Pierre-Kate-Vanessa



In the Paris sightseeing section of the STEM GRAND FINAL, it takes the sightseeing bus 10 minutes to cover a quarter of the distance between the Louvre Museum and the Eiffel Tower. The bus driver then accelerates and drives the rest of the way twice as fast as he did before.

Given the circumstances, how many minutes does the whole trip take from the Louvre Museum and the Eiffel Tower?

- A) 20 minutes
- B) 25 minutes
- C) 30 minutes
- D) 45 minutes



A teacher uses the following formula when calculating the passing grade for maths class:

Total score = $(20\% \times \text{homework} + 30\% \times \text{midterm} + 50\% \times \text{final exam})$. One needs 80 points to pass his/her maths class.

Hansel gets 60 points in the midterm exam and 90 points for her homework. What is the minimum score she must get in the final exam in order to pass the class?

- A) 68 B) 78 C) 88 D) 98



A number line is given above and points A, B and C are marked on it.

Which of the following cannot be the values of the numbers A, B, and C?

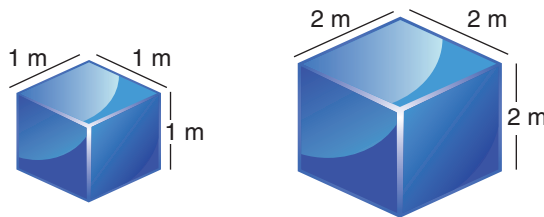
- A) A:3, B:5, C:8
B) A:-5, B:-3, C:0
C) A:-10, B:-8, C:-2
D) A:0, B:10, C:25



The last movie of the Harry Potter series, “Return to Hogwarts” is a beautiful 102-minute movie.

If one wants to watch the whole movie and finish it before 10 PM, when could he/she start watching it?

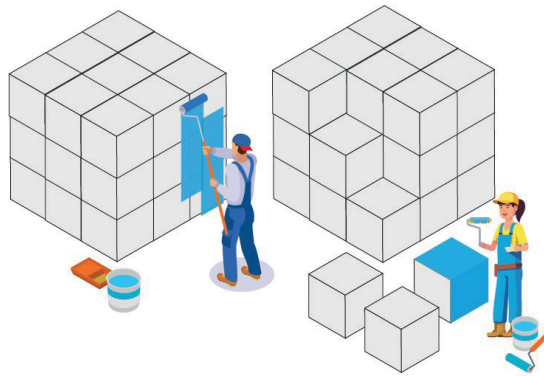
- A) 20.18 B) 20.58
C) 21.18 D) 21.42



The dimensions of the ice blocks cut with electric saws for scientific research in Antarctica are as given in the figure. The weight of the small ice block was measured as 900 kg.

How heavier is the larger block of ice than the smaller one?

- A) 900 kg
B) 3.600 kg
C) 6.300 kg
D) 7.200 kg

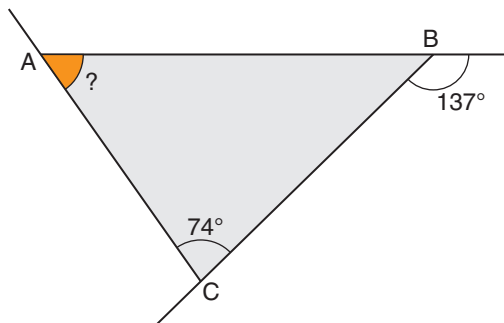


There are two giant cubes made from smaller cubes as shown in the figure above.

Peter paints the lateral and top surfaces of the giant cube on the right. Andy, on the other hand, first dismantles the giant cube into smaller cubes and then paints all the surfaces of the small cubes,

Given that Peter uses 4.5 kg of paint for his job, how much paint does Andy need?

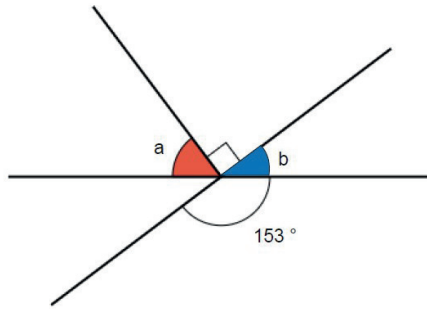
- A) 9 kg
- B) 13,5 kg
- C) 16 kg
- D) 16,2 kg



The exterior angle of vertex B and the interior angle of vertex C in triangle ABC are as shown in the figure.

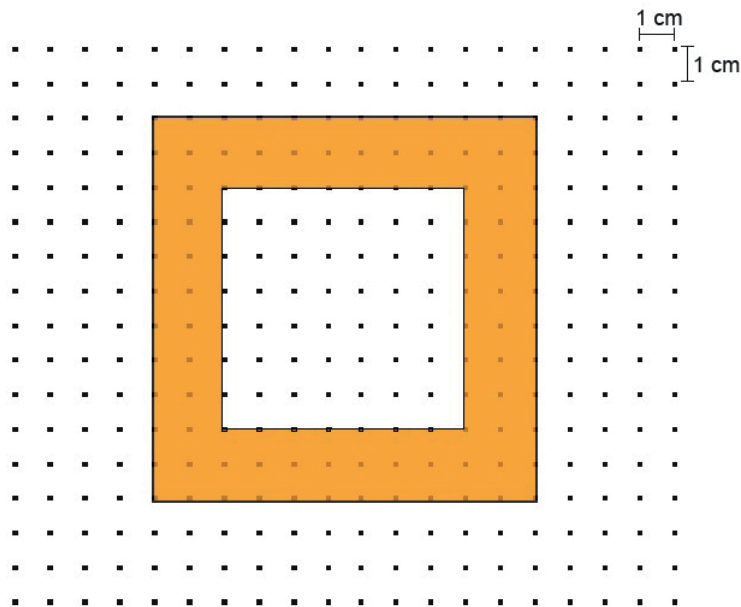
What is the measure of the interior angle of vertex A?

- A) 63°
- B) 65°
- C) 67°
- D) 74°



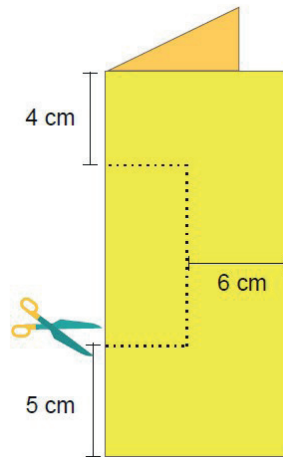
What is the difference of the angles 'a' and 'b'?

- A) 23° B) 27° C) 36° D) 63°



What is the area of the geometric figure given above?

- A) 49 cm^2
 B) 64 cm^2
 C) 72 cm^2
 D) 121 cm^2

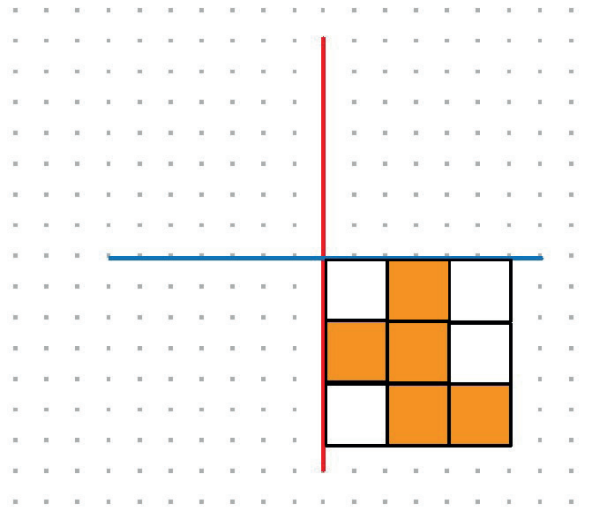


The side length of the yellow square cardboard in the figure above is 16cm.

Mary first folds the cardboard in half and then crops a square out of it through the dashed lines as shown in the figure. Finally she unfolds the piece she cut out.

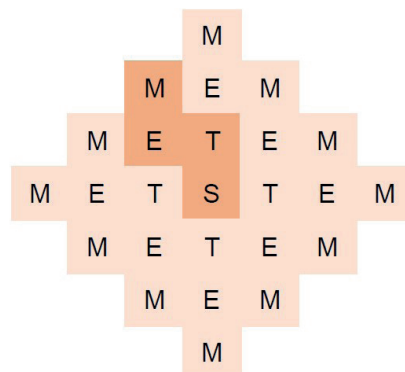
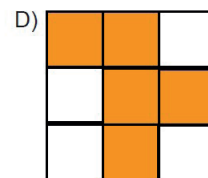
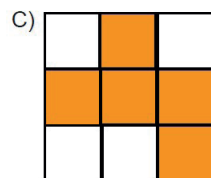
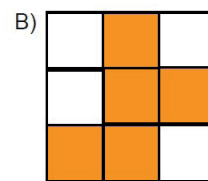
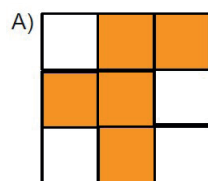
What is the perimeter of this square?

- | | |
|----------|----------|
| A) 12 cm | B) 22 cm |
| C) 28 cm | D) 40 cm |



Svetlana first takes the symmetry of the figure above with respect to the blue axis. Then she takes the symmetry of the new figure with respect to the red axis.

In which option is the last figure given?



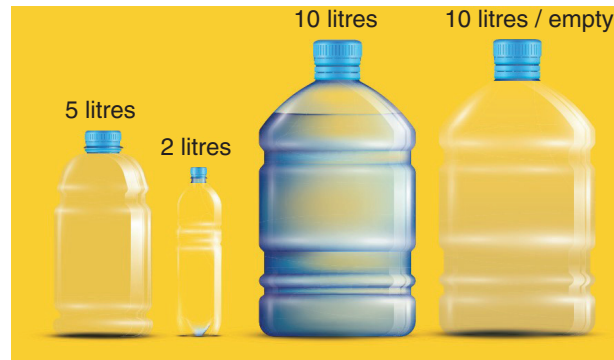
In the figure above, in how many different ways can the word “STEM” be spelled, starting with the letter S, moving vertically or horizontally but not diagonally. (A sample spelling is given above.)

A) 27

B) 28

C) 29

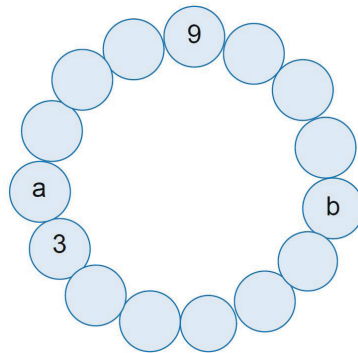
D) 30



You want to transfer 8 litres of the 10 litres of water in the 10-litre bottle into the empty 10-litre bottle. You have a 2-litre empty bottle and a 5-litre empty bottle.

At least how many times do you have to fill the 2-litre bottle with water?

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



Given that the sum of any three numbers in adjacent circles is 17, what is the ratio of the number 'a' to the number 'b'?

- A) 1 B) $\frac{3}{5}$ C) $\frac{1}{3}$ D) $\frac{5}{3}$