Herts
for Learning

Herts for Learning is a not for profit company providing school improvement and business services. With over 500 shareholder schools, Herts for Learning is dedicated to improving standards of education in Hertfordshire and beyond.

Year 7 Mathematics Challenge

The Four Rounds

Round 1   General Maths questions

Round 2   Memory Round

Break

Round 3   Estimation Round

Round 4   General Maths questions

60 marks for each round.

Preliminaries

- If your school has more than one team, decide on a 'Team A' and a 'Team B'.

- Make sure you write your team name on each Answer Sheet.

- Units are important! Correct answers with incorrect or missing units will not get full marks.

- Three heats. Top three teams from each round will go through to the Final on Wednesday 24th April.

Round 1

General Mathematics Questions

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In this magic square, each row, column and diagonal add up to the same number.

18			
13	15		
	10	11	17
	🟩	16	14

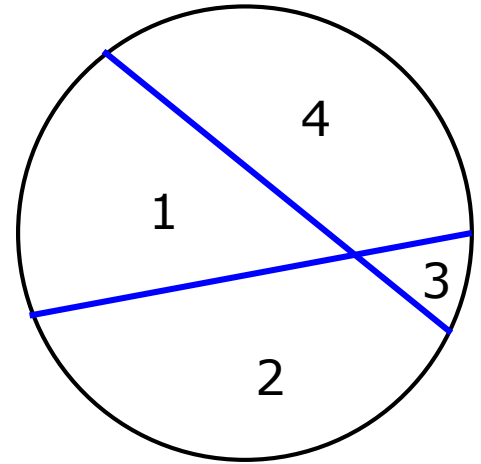What number goes in the green square?

This diagram shows a circle with two chords, drawn in blue.

The two chords divide the circle into 4 regions.

If **three** chords are drawn, what is the largest number of regions a circle can be divided into?

Amelia has 3 brothers and 5 sisters.

Her brother David has S sisters and B brothers.

What is the value of $S \times B$?

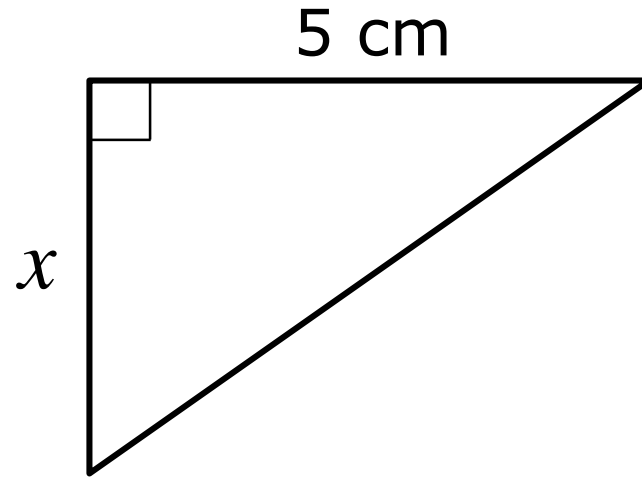Ashani takes **4 tests**. Each test was marked out of **100**.
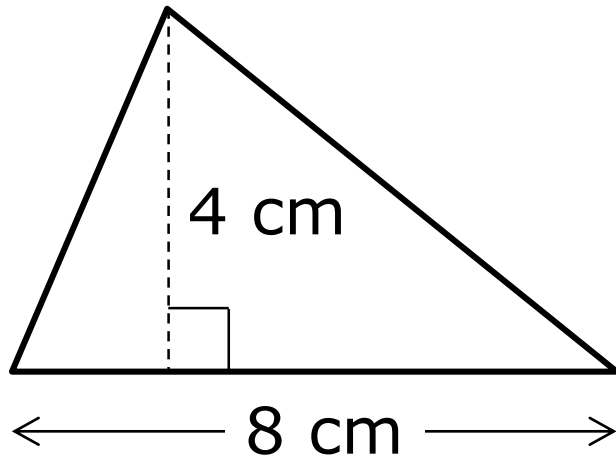
His mean score in the 4 tests was **85**.

What was the lowest score Ashani could have scored in any of the tests?

These two triangles have the **same area**. (They are not drawn to scale.)

Work out the length marked x.

Rahul and Sean take the same test.

Rahul scores $\dfrac{3}{4}$ of the maximum mark.

Sean scores $\dfrac{2}{3}$ of the maximum mark.

Rahul scores 6 marks more than Sean.

What was the maximum mark for the test?

End of Round 1

Round 1
ANSWERS

In this magic square, each row, column and diagonal add up to the same number.

18			
13	15		
20	10	11	17
7	**21**	16	14

What number goes in the green square?

This diagram shows a circle with two chords, drawn in blue.

4

1

3

2

The two chords divide the circle into 4 regions.

If **three** chords are drawn, what is the largest number of regions a circle can be divided into?

Answer: 7

Amelia has 3 brothers and 5 sisters.

Her brother David has S sisters and B brothers.

What is the value of $S \times B$?

Answer: 12

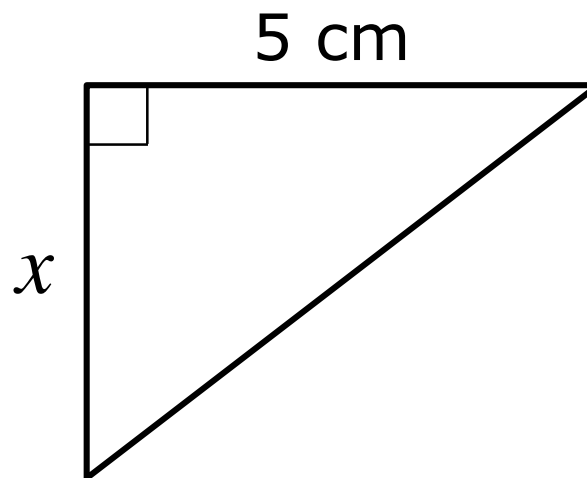Ashani takes 4 tests, each marked out of 100.

His mean score in the 4 tests was 85.

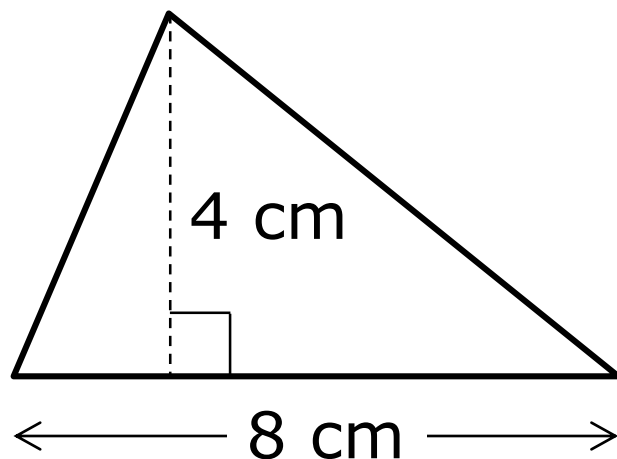What was the lowest score Ashani could have scored in any of the tests?

Answer: 40

These two triangles have the **same area**.

Work out the length marked x.

Answer: 6.4 cm

Rahul and Sean take the same test.

Rahul scores $\frac{3}{4}$ of the maximum mark.

Sean scores $\frac{2}{3}$ of the maximum mark.

Rahul scores 6 marks more than Sean.

What was the maximum mark for the test?

Answer: 72

Round 2

Memory Round

Memory Round

We have a hidden mathematical poster.

Two members of your team (the **observers**) are allowed to come and look at the poster.

They must then go back and describe it for the other two people (the **scribes**) to draw.

The observers are not allowed to draw the poster, or make notes when they are looking at the poster.

When describing the poster, observers must use words only. They are not allowed to draw anything, or use their hands in any way.

Memory Round

The observers will have four chances to view the poster.

30 seconds to view
2 minutes to describe

30 seconds to view
2 minutes to describe

30 seconds to view
2 minutes to describe

30 seconds to view
2 minutes to describe

Scribes can draw at any time during the whole period.

After this, the team must hand their poster in immediately, with their team name on it.

Only ONE sheet must be handed in per team.

Memory Round

You now have one minute to:

- decide who will be the observers and who will be the scribes;

- find pencils, rubbers and anything else you might need;

- decide on tactics!

Round 2

Memory Round

Round 2
ANSWER

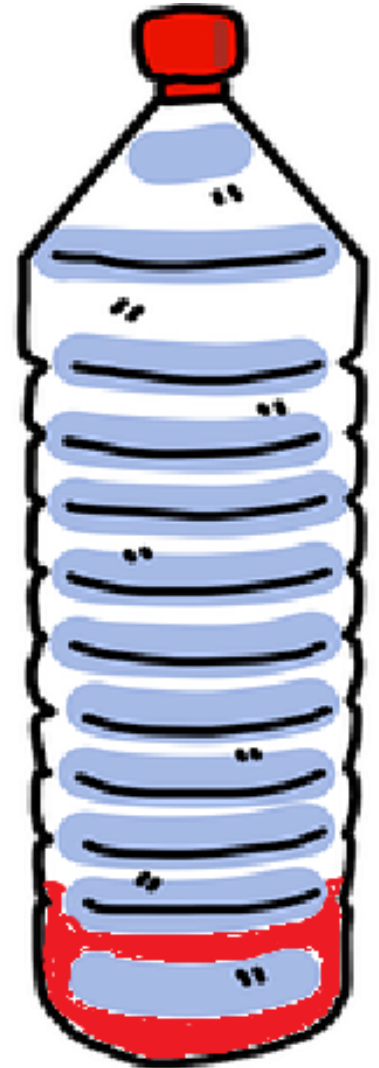# Memory Round

End of Round 2

BREAK

Round 3

Visual / Estimation Round

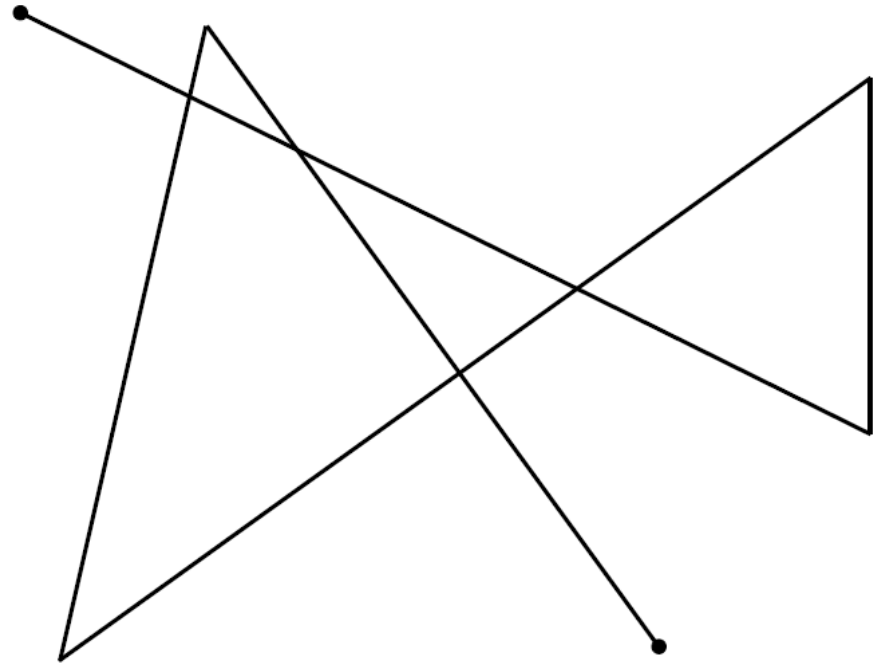# To the nearest 100, estimate how many grains of rice there are in this 100g bag.

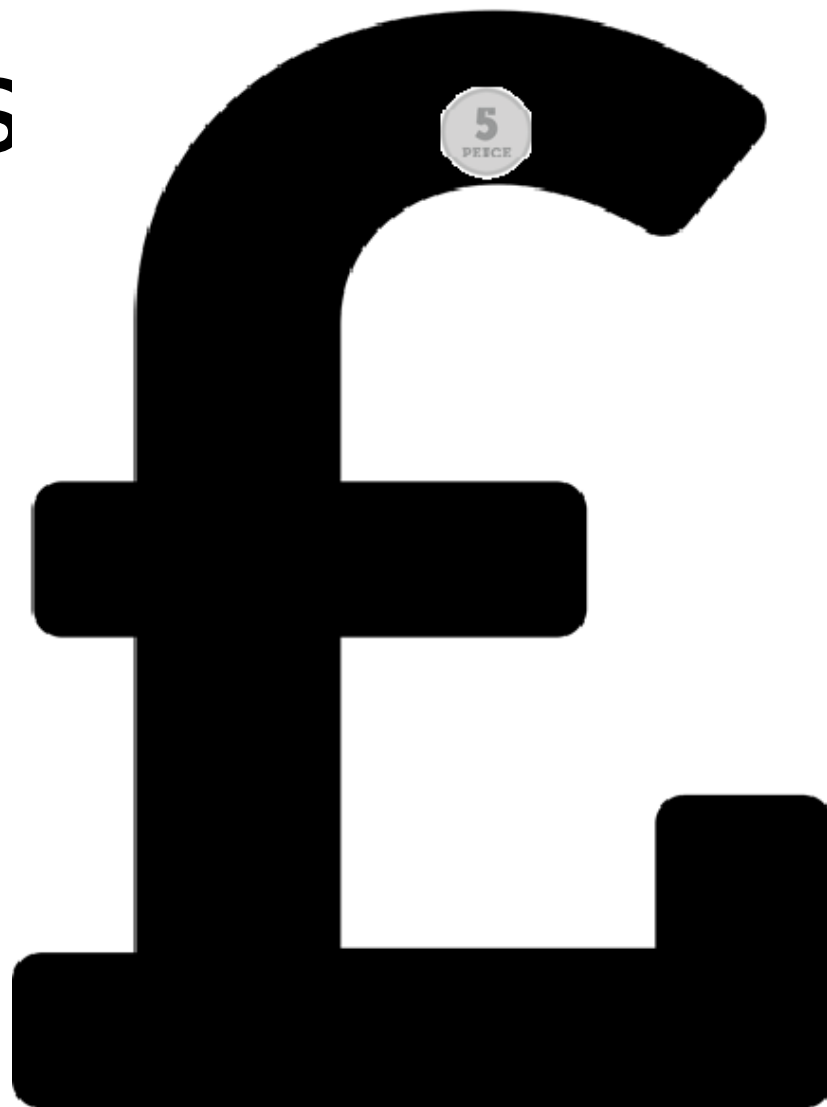Estimate how many more cups full of water would be needed to fill the bottle.

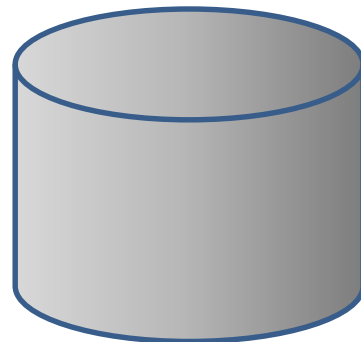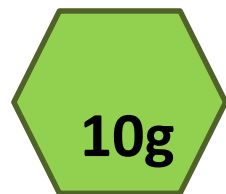In whole
centimetres,
estimate
the length
of this line.

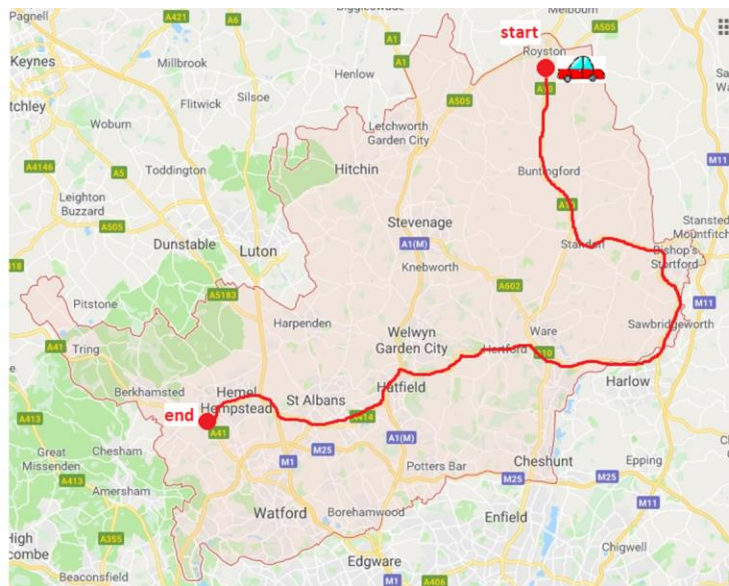If the £ sign is covered with 5p pieces, what will be the total **monetary value**?

How many of these **10g** masses are equivalent in **mass** to this tin of baked beans?

10g

To the nearest 10 kilometres, estimate how far the car has travelled.

End of Round 3

Round 3
ANSWERS

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To the nearest 100, estimate how many grains of rice there are in this 100g bag.

Answer: 5000

(so accept 4,900 to 5,100 for full marks)

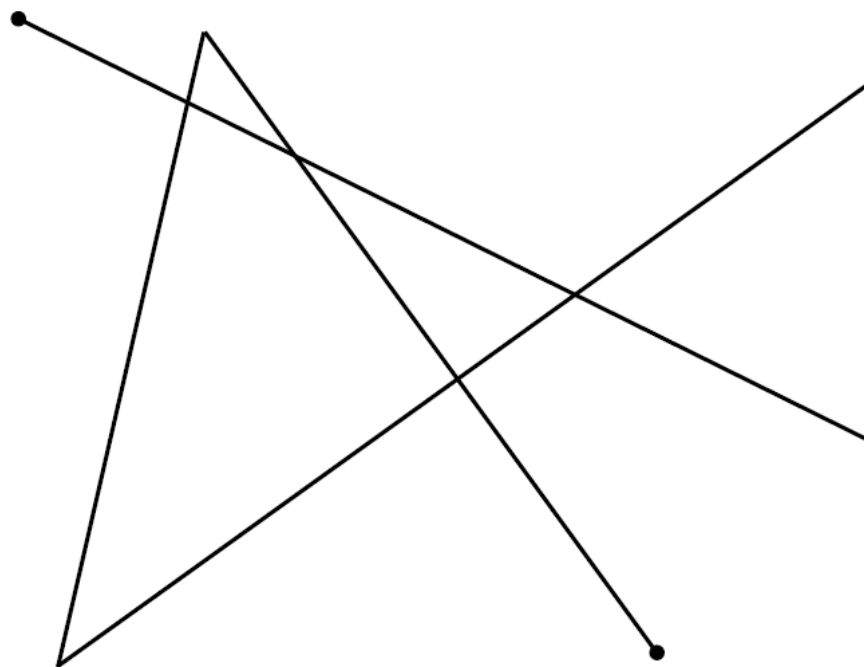Estimate how many more cups full of water would be needed to fill the bottle.

Answer: 8

In whole
centimetres,
estimate
the length
of this line.

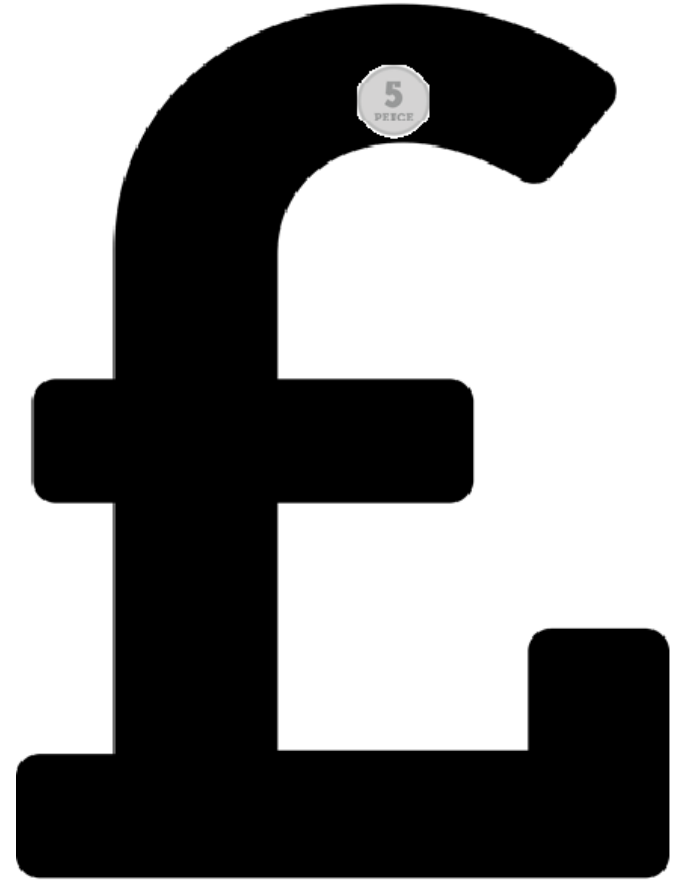**Answer: 94 cm**

If the £ sign is covered with 5p pieces, what will be the total **monetary value**?

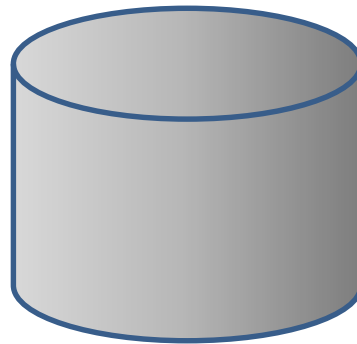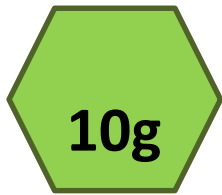**Answer: £3.30**

How many of these **10g** masses are equivalent in **mass** to this tin of baked beans?

10g

Answer: 21

To the nearest 10 kilometres, estimate how far the car has travelled.

Answer: 86 km

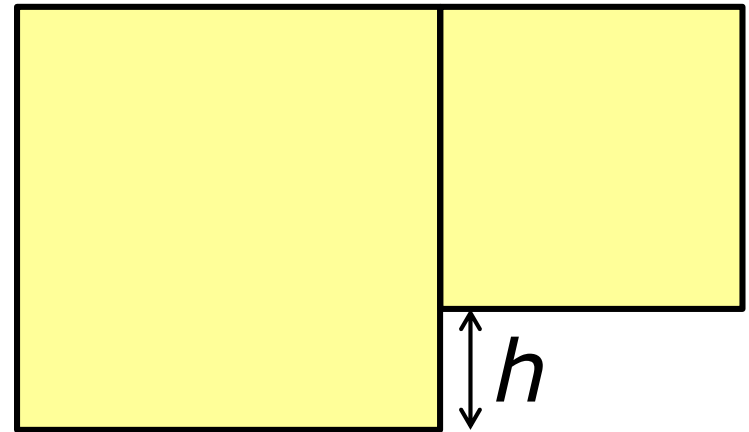(so accept 80 to 90 for full marks)

Round 4

General Mathematics Questions

The diagram shows **two squares** joined together to make a shape.

The lengths of the sides of each square are integers.

The total area of the shape is **89 cm²**.

What is the length marked *h*?
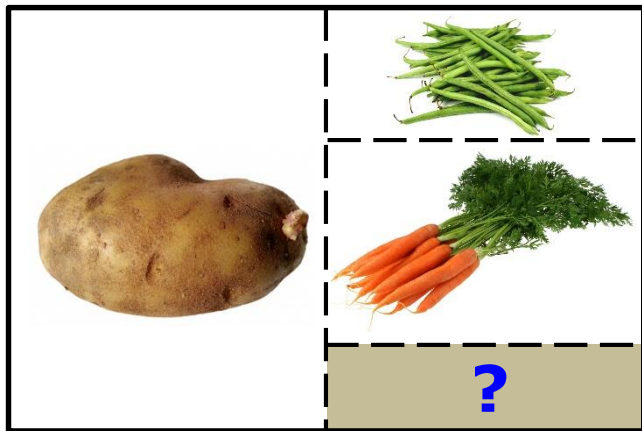
Multiply together:

- the number of factors of 24

- the number of two-digit multiples of 36

- the number of prime numbers between 40 and 50

Jeremy has an allotment.

He uses:

(not to scale)

$\frac{1}{2}$ of the allotment to grow potatoes;

$\frac{3}{20}$ to grow beans;

$\frac{8}{25}$ to grow carrots.

What percentage of Jeremy's allotment is left?

Here are the first five terms of a linear sequence:

3   9   15   21   27

If the sequence is continued, how many terms in the sequence will have exactly two digits?

Some numbers can be written as the sum of **two primes**, for example:
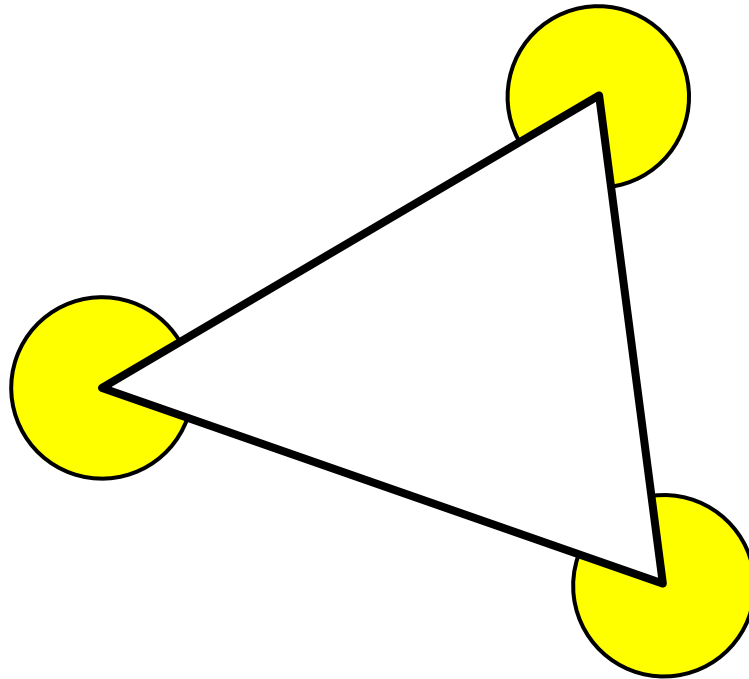
$$30 = 11 + 19 \qquad 34 = 17 + 17$$

There are **five** numbers **less than 20** that <u>cannot</u> be written as the sum of two primes.

List all five numbers.

Here is a triangle.

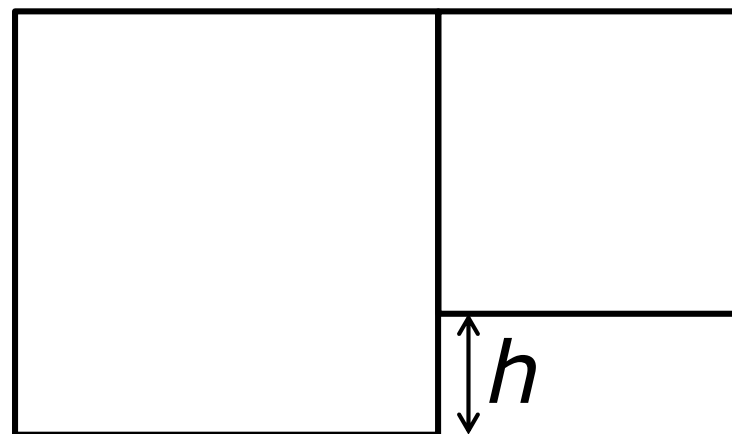What is the sum of the yellow angles?

End of Round 4

Round 4
ANSWERS

The diagram shows **two squares** joined together to make a shape.

The lengths of the sides of each square are integers.

The total area of the shape is **89 cm²**.

What is the length marked *h*?

Answer: 3 cm

Multiply together:

- the number of factors of 24   **8**

- the number of two-digit multiples of 36   **2**

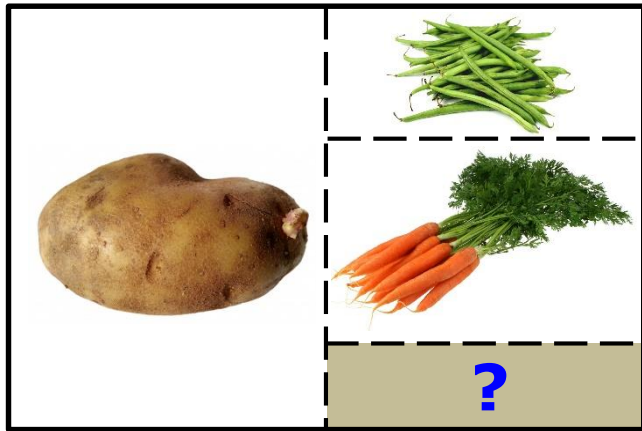- the number of prime numbers between 40 and 50   **3**

Answer: 48

Jeremy has an allotment.

He uses:

$\frac{1}{2}$ of the allotment to grow potatoes; **50%**

$\frac{3}{20}$ to grow beans; **15%**

$\frac{8}{25}$ to grow carrots. **32%**

?

(not to scale)

What percentage of Jeremy's allotment is left?

Answer: 3%

Here are the first five terms of a linear sequence:

3   9   15   21   27

If the sequence is continued, how many terms in the sequence will have exactly two digits?

Answer: 15

Some numbers can be written as the sum of **two primes**, for example:

$$30 = 11 + 19 \qquad 34 = 17 + 17$$

There are **five** numbers **less than 20** that <u>cannot</u> be written as the sum of two primes.
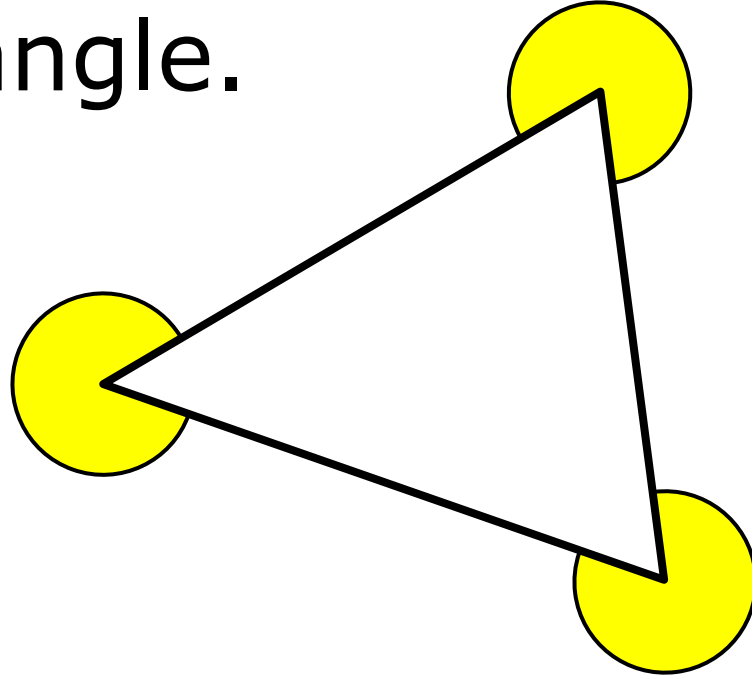
List all five numbers.

Answer: 1, 2, 3, 11, 17

Here is a triangle.

What is the sum of the yellow angles?

Answer: 900°

Well done to all

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