



UKMT Team Maths Challenge 2012 National Final - Relay Race

A1

I think of a positive number, add 7, divide by 3, subtract 3 and square the result.

The final answer is 16.

What number did I think of?

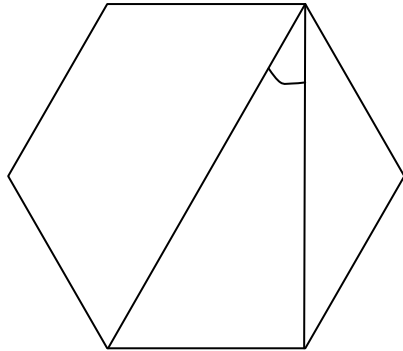
Answer



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A2

Find the size of the angle marked in the regular hexagon below.



Answer

0



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A3

Nick works in a shop and displays his cans in triangular based pyramids, so that there is one can on the top, then three on the second layer down, then six, then ten etc. How many cans does he need to make a pyramid with eight layers?

Answer



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A4

If: $a + b = 32$

$$b + c = 19$$

and $a + c = 17$

what is $a + b + c$?

Answer



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A5

Sue writes out a list of numbers, starting 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and so on.

How many digits will she have written when she has just finished writing 150?

Answer



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A6

What is the median number of letters per word when the numbers from “one” to “ten” are written down?

Answer



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A7

Two positive numbers have a product of 120 and a difference of 7.
What are the two numbers?

Answer	and
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A8

George is allowed 25% extra time for each examination paper. Geography is usually 1 hour 20 minutes and starts at 10:30, and History starts at 13:15. How much time, in minutes, will George have between his exams?

Answer	minutes
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A9

Hugh, Kay, Emma and Tee have £28 altogether.

Hugh has £3 more than Kay and £2 more than Emma.

Tee has £1 less than Emma.

How much does Hugh have?

Answer £



A10

A mathematical grandmother has a large tin of sweets for her grandchildren. On the first day they eat 25% of the sweets, on the second day they eat $\frac{1}{2}$ of what is left, on the third day they eat $\frac{2}{3}$ of the remaining sweets and 18 are left. How many were in the tin at the start?

Answer



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A11

Sweets are packed into cylindrical tins which have the same height. If the tin with diameter 10 cm holds 60 sweets, how many does the tin with diameter 20 cm hold?

Answer



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A12

What is the obtuse angle between the hands of a clock at 8:12?

Answer

0



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A13

What is the difference in the cost per apple when Sainsrose sells them at 51p for a bag of 6 and Waitburys sells 10 apples for 65p?

Answer	p
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A14

The ratio of boys to girls in a class of 24 pupils is 5:3. A third of the girls and a fifth of the boys are absent one day. What is the ratio of boys to girls in the class on that day?

Answer	:
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A15

A square board of side 1.25 m is used to display pupils' work. All the work has been mounted on card $30\text{ cm} \times 25\text{ cm}$. Assuming that there is a gap of at least 1 cm between sheets and at the edge, and that they are displayed 'landscape', how many sheets can be fitted on the board?

Answer



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B1

The sum of four consecutive even numbers is 2012. What is the smallest one?

Answer



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B2

Ten bricks were placed in a row with spaces between them. 10p was put between the first two, 20p in the next gap, 30p in the next gap, and so on until all the gaps had money in them. How much money was used altogether? Give your answer in £ and p.

Answer £



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B3

What is the first prime number greater than 500?

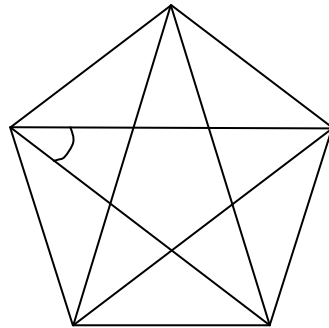
Answer



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B4

Find the size of the angle marked in the regular pentagon below.



Answer

°



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B5

Shona works in a shop and displays her cans in square based pyramids, so that there is one can on the top, then four on the second layer down, then nine, then sixteen etc.

How many cans does she need to make a pyramid with seven layers?

Answer



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B6

Emily is allowed 25% extra time for each examination paper. If English is usually 1 hour 40 minutes and starts at 9:45, and History starts at 13:15, how much time, in minutes, will Emily have between her exams?

Answer

minutes



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B7

Two positive numbers have a product of 240 and a sum of 32.
What are the two numbers?

Answer

and



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B8

In a school, classrooms have either exactly 30 desks or exactly 35 desks.

There are 330 desks altogether in 10 classrooms.

How many classrooms have exactly 30 desks?

Answer



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B9

What is the median number of letters in each of the words in this sentence?

Answer



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B10

One of the months in a particular year has five Wednesdays, and the third Saturday is the 19th.

What day of the month is the last Wednesday?

Answer



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B11

What is the reflex angle between the hands of a clock at 9:24?

Answer

°



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B12

Martin pays £1.89 for his shopping using exactly the same number of each of three different types of coin. The smallest coin he uses is a 2p. What are the other types of coin?

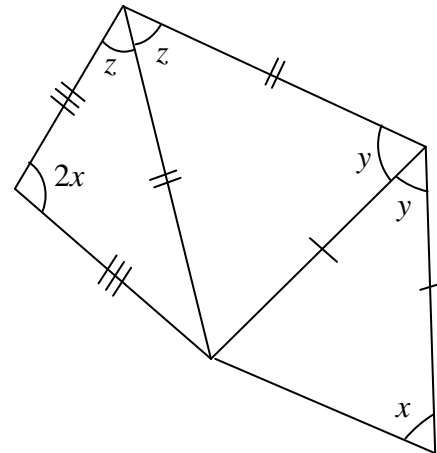
Answer and



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B13

Find the size of angle x .



Answer	0
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B14

In the grid there are 9 numbers. At the start five of the boxes are grey and 4 are white.

Then the boxes with prime numbers have their colours switched (grey to white, or white to grey).

Then the boxes with square numbers have their colours switched.

Then the boxes with odd numbers have their colours switched.

1	2	3
4	5	6
7	8	9

How many more grey squares than white squares are there after the switches?

Answer



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B15

Chairs are stored on the floor either singly in a square space of side 40 cm or as a stack of 4 chairs requiring a square space of side 50 cm. How many chairs can be stored in a space $320 \text{ cm} \times 140 \text{ cm}$?

Answer
