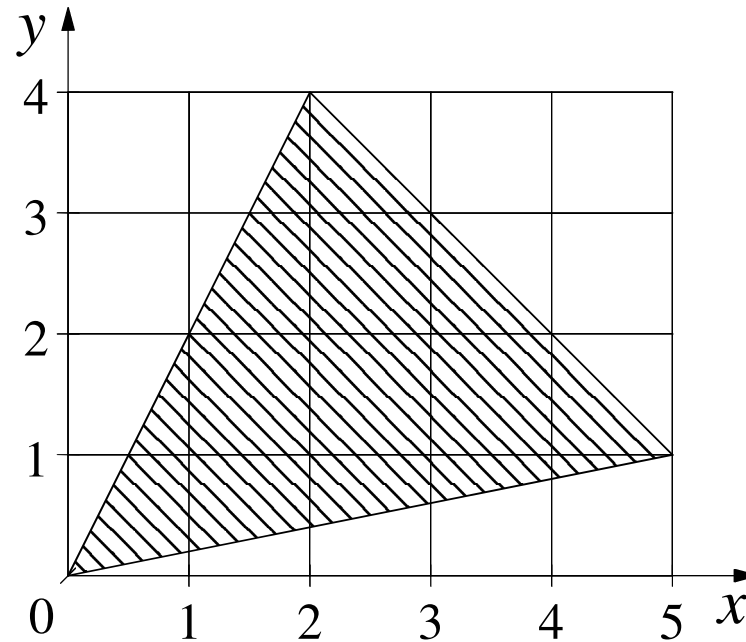


TEAM MATHS
CHALLENGE
2016

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RELAY

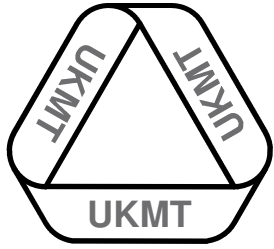
A1



What is the area of the shaded triangle?

ANSWER:

square units



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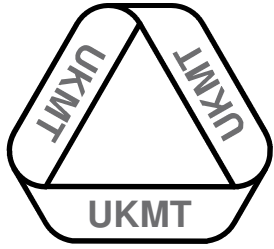
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RELAY

A2

What is the product of the smallest two-digit triangular number and the largest two-digit prime number?

ANSWER:



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RELAY

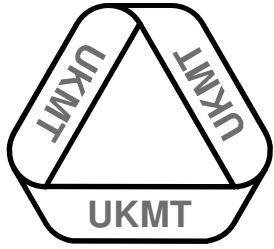
A3

Each of five pupils has a different number of pens in their pencil cases. The mean is 6.4 pens.

What is the highest possible number of pens in a pencil case?

ANSWER:

pens



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RELAY

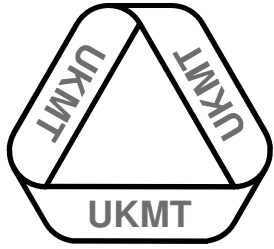
A4

In one week Sonja works for $17\frac{1}{2}$ hours at £8.40 an hour and then 8 hours at £9.00 per hour.

25% of this gross wage is deducted for tax, etc.

What is left per week?

ANSWER:



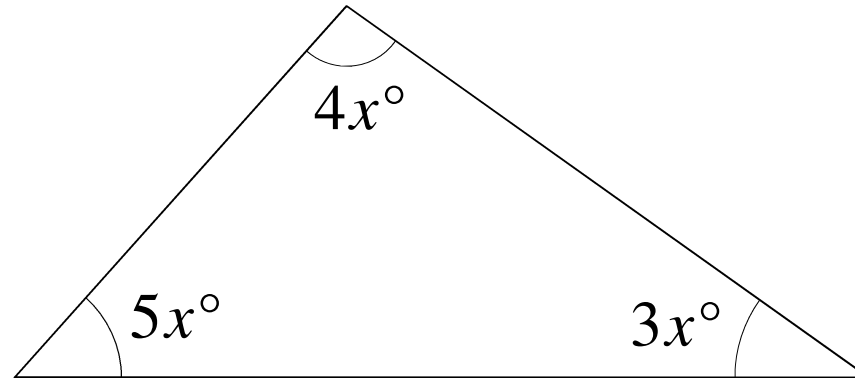
A5

What is the size of the smallest angle in this triangle?

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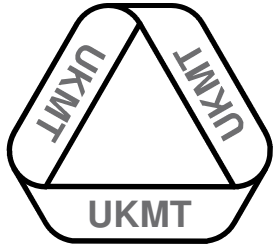
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ANSWER:

degrees



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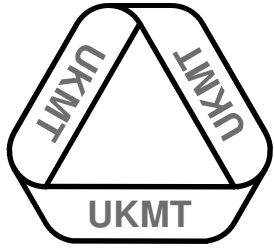
RELAY

A6

An odd three-digit number less than 200 has digit product 4.

What is the number?

ANSWER:



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RELAY

A7

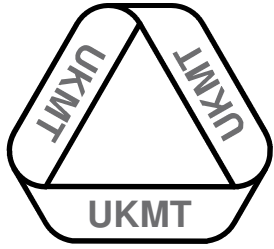
On a map with scale 1:50 000, the path Martha is going to walk is 4 cm long.

She walks at 4 km per hour.

In minutes, how long will it take her?

ANSWER:

minutes



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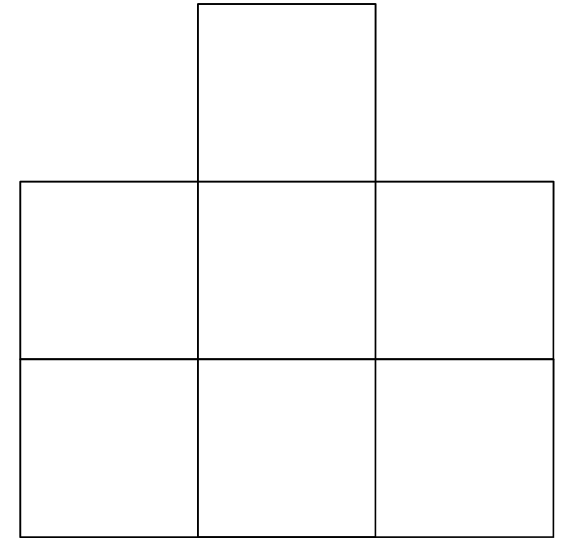
RELAY

A8

The diagram shows the pattern of square slabs that form a patio.

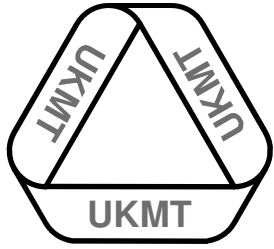
The area of the patio is 5.67 square metres.

What is the perimeter?



ANSWER:

metres



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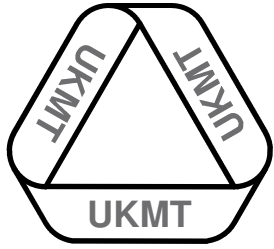
RELAY

A9

A mathematical grandmother allows her six grandchildren equal shares of her dog-walking for 2016. Art does all his share first, starting on 1 January.

What is the date when Bert takes over from Art?

ANSWER:



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2016

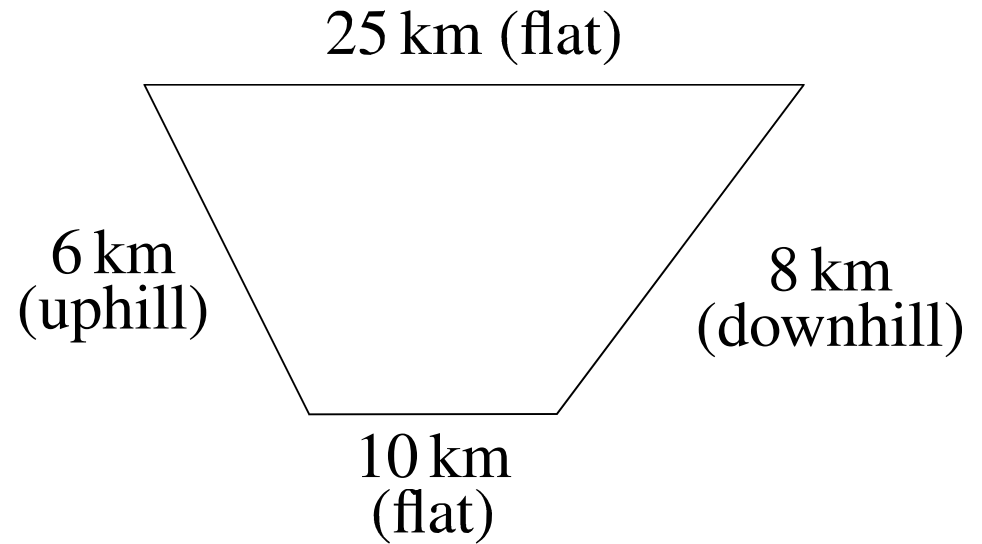
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RELAY

A10

Amid is planning to take part in a long-distance cycle race.

His training route is 49 km long, as shown.

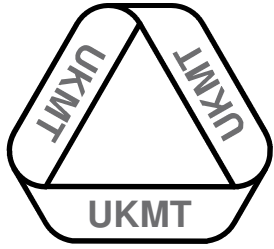


He cycles at an average speed of 30 km per hour along the flat, 24 km per hour uphill and 40 km per hour downhill.

How many minutes does he take to cover one circuit?

ANSWER:

minutes



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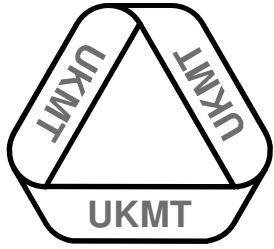
RELAY

A11

A train left the station at 10:16, twenty-three minutes late. The driver was not able to make up any of the time and so the train took the same length of time as usual to reach the next station, that is, 89 minutes.

At what time should the train have arrived if it was on time?

ANSWER:



A12

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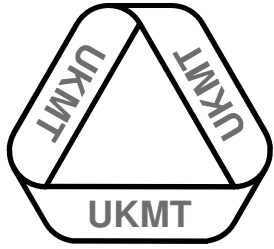
REGIONAL FINAL

RELAY

Let t be the number of edges of a triangle.
Let q be the number of edges of a quadrilateral.
Let p be the number of edges of a pentagon.
Let d be the number of edges of a decagon.
Let e be the number of even prime numbers.
Let s be the smallest prime number.

Calculate $d^2(tqp + e) + s$.

ANSWER:



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RELAY

A13

In the United Kingdom a pint is 20 fluid ounces, while in the USA a pint is 16 fluid ounces.

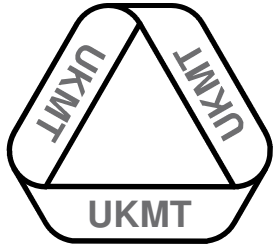
The fluid ounce has the same volume in both countries, and there are 8 pints in a gallon.

My car averages 60 miles per gallon in England.

How many miles per gallon can I expect it to do in similar conditions in America?

ANSWER:

miles per gallon



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2016

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RELAY

A14

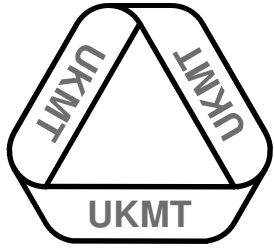
The following two equations are plotted on a graph.

$$y = 4 - 3x$$

$$y = 2x - 1$$

At what point do the two lines intersect?

ANSWER:



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RELAY

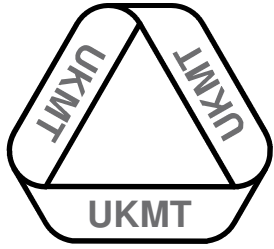
A15

Rachel, Nicky and Shona buy a large packet of popcorn.

Rachel eats $\frac{1}{4}$ of the packet and passes it to Nicky, who eats $\frac{1}{5}$ of the remainder before passing it to Shona who eats $\frac{1}{6}$ of what is left.

What fraction of the packet remains for them to pass on to Steve?

ANSWER:



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CHALLENGE
2016

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RELAY

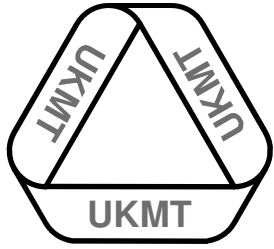
B1

Jane puts her hand into an opaque bag containing seven pairs of gloves. There are four red pairs and three green pairs. In each pair the left glove is different to the right glove. Jane pulls out one glove at a time.

How many must she pull out to be certain of a pair?

ANSWER:

gloves



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CHALLENGE
2016

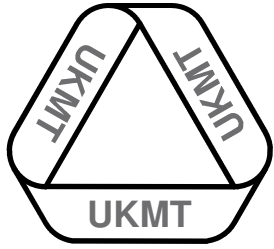
REGIONAL FINAL

RELAY

B2

Which three-digit number is not a prime, is palindromic and has the sum of its digits equal to seven?

ANSWER:



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CHALLENGE
2016

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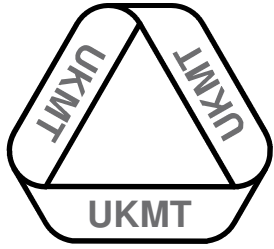
RELAY

B3

To celebrate the maths club's 150th birthday Dr Smith has ordered 168 commemorative items. To pay for this he has included, in his order, a number of items for sale. Of the order, $\frac{1}{3}$ are mugs to be given free to the members and $\frac{1}{12}$ are ties which will be given to helpers and staff. The rest of the items will be sold.

How many items were for sale?

ANSWER:



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RELAY

B4

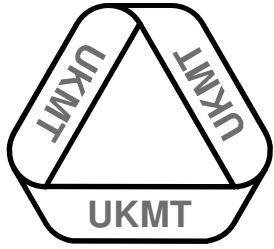
The following two equations are plotted on a graph.

$$y = 3x - 3$$

$$y = 2x$$

At what point do the two lines intersect?

ANSWER:



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CHALLENGE
2016

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RELAY

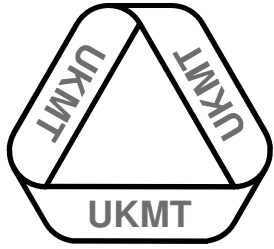
B5

A cuboid has a square base and is $1\frac{1}{2}$ times as high as it is wide.
The shortest edges are 12 cm long.

What is the volume of the cuboid?

ANSWER:

cm³



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2016

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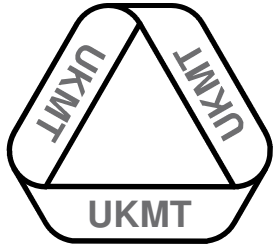
RELAY

B6

Mrs Christie invested £80 000 while Mr Dickens invested £60 000. They shared the profits of £23 800 in the ratio of their investments.

How much profit did Mr Dickens receive?

ANSWER: £



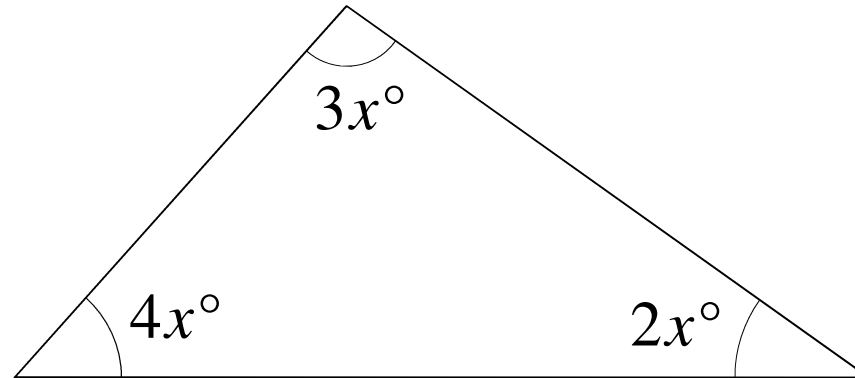
B7

What is the largest angle of this triangle?

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CHALLENGE
2016

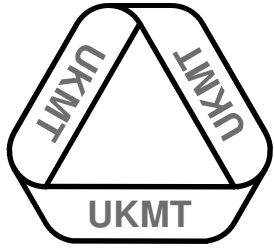
REGIONAL FINAL

RELAY



ANSWER:

degrees



TEAM MATHS
CHALLENGE
2016

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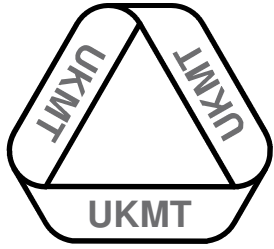
RELAY

B8

A 10 lb turkey needs to be cooked by 19:30 and the oven takes 20 minutes to heat up to the right temperature. The cooking time is then 20 minutes per pound.

What is the latest time at which the oven can be turned on?

ANSWER:



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2016

REGIONAL FINAL

RELAY

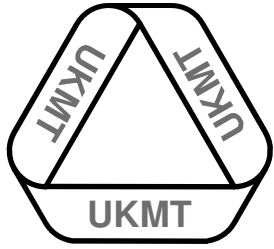
B9

Harry pays £85 deposit on a bike, then £85.50 per month until he pays for the bike in full. The bike costs £854.50.

For how many months did Harry pay until he owned the bike?

ANSWER:

months



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2016

REGIONAL FINAL

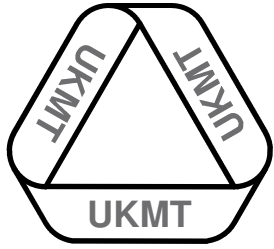
RELAY

B10

Joshua averages 34 marks in nine tests. His average mark for the first five tests is 37 and in the last five his average is 32 marks.

What was his score for the fifth test?

ANSWER:



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CHALLENGE
2016

REGIONAL FINAL

RELAY

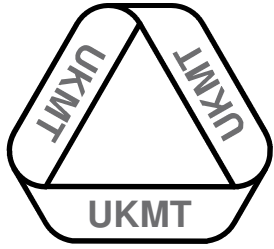
B11

Great-granny GG takes one a day of each of two types of tablet, A and B. Tablet A is in packs of 30, tablet B in packs of 25.

GG starts new packets of both on 1 July.

On what date will she next start new packets of both?

ANSWER:



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CHALLENGE
2016

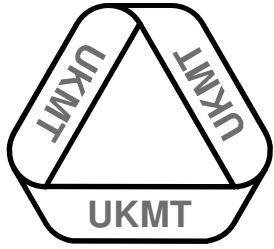
REGIONAL FINAL

RELAY

B12

What is the product of the smallest two-digit prime number and the largest two-digit Fibonacci number?

ANSWER:



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2016

REGIONAL FINAL

RELAY

B13

Peter and Alan are sitting facing each other on opposite sides of a desk. Peter uses a calculator, and an example of how his calculator displays its answers is shown below.

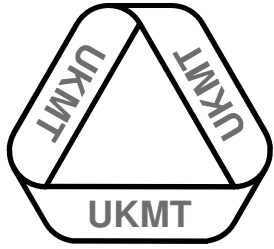
2068

For one question, Peter's calculator shows the answer 2016.

Alan sees a different number, since the calculator is upside-down for him.

What is the difference between their two numbers?

ANSWER:



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CHALLENGE
2016

REGIONAL FINAL

RELAY

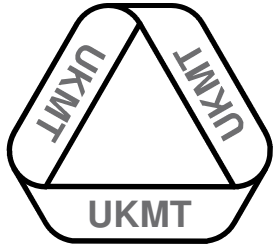
B14

Mike runs eight laps of the school track at 66 seconds per lap and Jane runs the eight laps in 9 minutes and 4 seconds at a steady speed.

What is the difference in their average times for one lap?

ANSWER:

seconds



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2016

REGIONAL FINAL

RELAY

B15

Charlie bought 200 shirts at £4.50 each and increased that by 60% to calculate the selling price.

He sold 101 shirts and, to sell the rest, he offered them at 3 for the price of 2.

How much profit, in pence, did he make on each of the last 99 shirts?

ANSWER:

pence