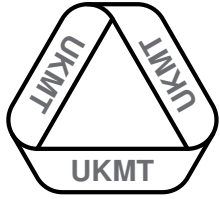


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# A1

Using only the numbers between 122 and 128 inclusive, find the difference between the number that is one more than a multiple of four and the number that is a multiple of seven.

ANSWER:



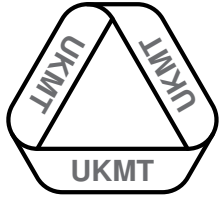
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

**A2**

The mean of five numbers is 8. The mode is 9 and the range is 4.

What are the numbers?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014

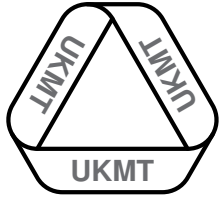
REGIONAL  
FINAL  
RELAY

# A3

Ann thinks of a number. When she multiplies it by 10 and subtracts 4, she obtains the same number as if she had multiplied by 7 and added 2.

What is Ann's starting number?

ANSWER:

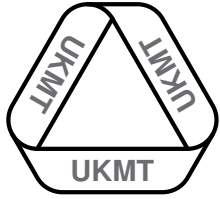


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

**A4**

What is the sum of the different prime numbers that divide exactly into 3528?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

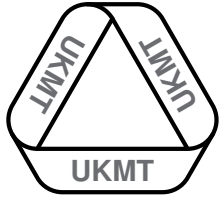
**A5**

There are 14 pounds (lb) in a stone (st).

Three children weigh 4 st 5 lb, 5 st 2 lb and 5 st 4 lb.

What is their mean weight in stones and pounds?

ANSWER:



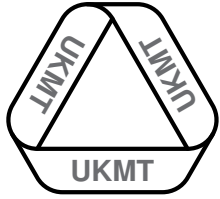
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# A6

The paint department has to paint a batch of widgets. On Monday they paint one third of the batch, and on Tuesday 45% of what is left. On Wednesday they find they have 99 widgets left to paint.

How many widgets are in the batch?

ANSWER:



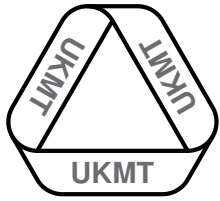
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

**A7**

Lawn feed is sold to the horticultural society in 3.5 kg tubs and they then repackage it into 400 g packets for their members.

How many full packets can they make from six tubs?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

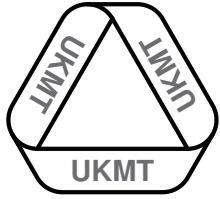
# A8

The coordinates of two of the vertices of a trapezium are  $(3, 5)$  and  $(2, 7)$ . It has a line of symmetry  $x = 4$ .

What are the coordinates of the other two vertices?

ANSWER:





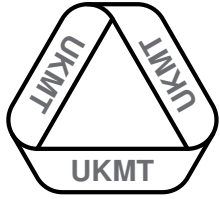
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

A9

Each term in a sequence of numbers is formed by doubling the previous number and then adding one. The third number is 31.

What is the first number of this sequence?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014

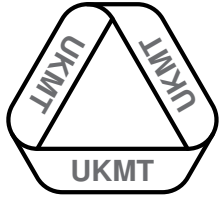
REGIONAL  
FINAL  
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# A10

Last year, at the TMC National Final on 18th June 2013, I calculated that my next birthday would be in 3 months, 3 weeks and 3 days.

On what date is my birthday?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014

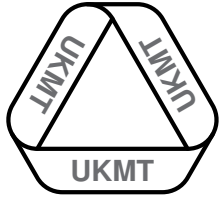
REGIONAL  
FINAL  
RELAY

# A11

A mathematics teacher has a 45-minute lunch break. She spends 15 minutes eating her lunch, 10 minutes helping a student, 12 minutes marking and the rest of the time talking to a colleague.

When this information is drawn on a pie chart, what is the angle for 'talking to a colleague'?

ANSWER:



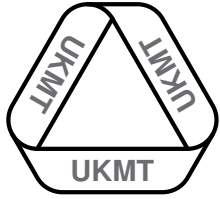
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# A12

Twenty people take apple pie or ice cream or both from the buffet.  
65% have apple pie and 95% have ice cream.

How many have only one?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
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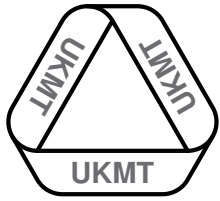
# A13

Trevor makes a rectangular lawn 7.5 metres by 3.2 metres.

Turf costs £5 per square metre.

What will it cost to turf the area completely?

ANSWER: £



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

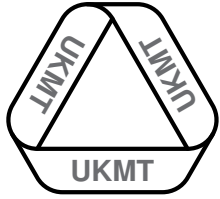
# A14

The figure shows a partially completed magic square.

|     |     |     |
|-----|-----|-----|
|     |     | 2.6 |
|     | 2.5 | 3.1 |
| 2.4 |     |     |

What number goes in the shaded cell?

ANSWER:

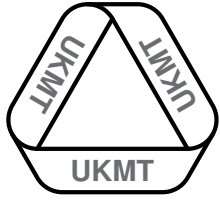


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# A15

To the nearest thousand minutes, how many minutes are there in the year 2014?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B1

A bucket contains 7.5 litres of weed killer.

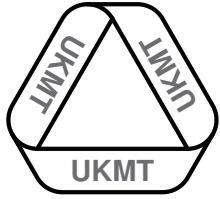
The instructions say “use 50 ml per square metre”.

What area can be treated with this bucket?

ANSWER:

$\text{m}^2$





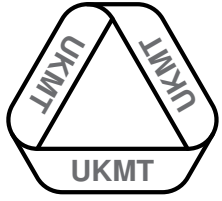
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B2

Each term in a sequence of numbers is formed by halving the previous number and then subtracting four. The third number is 6.

What is the first number in this sequence?

ANSWER:



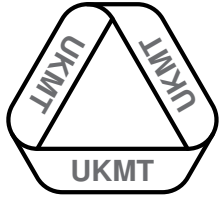
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

**B3**

New Year's Day 2020 will be a Wednesday.

What day of the week is 1st June 2020?

ANSWER:

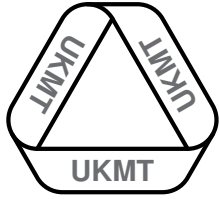


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B4

Using only the numbers between 160 and 167 inclusive, find the difference between the number that is one less than a multiple of six and the number that is a multiple of eleven.

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B5

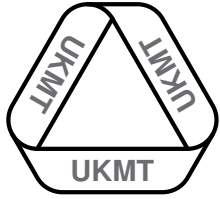
Bill is on a ten-day cycling holiday. In the first five days his mean daily distance is 5.2 km.

In the next five days Bill cycles a total of 50.5 km.

What is his overall mean daily distance?

ANSWER:

km



UKMT  
TEAM MATHS  
CHALLENGE  
2014

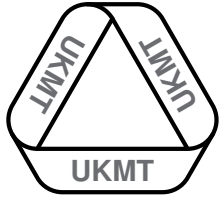
REGIONAL  
FINAL  
RELAY

# B6

Sue thinks of a number. When she multiplies it by 7 and adds 3 she obtains the same number as if she had multiplied by 2 and added 18.

What is Sue's starting number?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

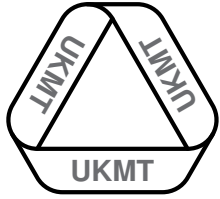
# B7

There are 12 inches (in) in 1 foot (ft)

Three children are measured and their heights are 4 ft 4 in, 4 ft 6 in and 5 ft 2 in.

What is their mean height in feet and inches?

ANSWER:

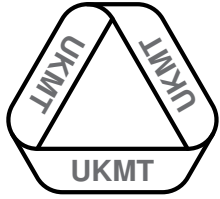


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B8

What is the sum of the different prime numbers that divide exactly into 13068?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

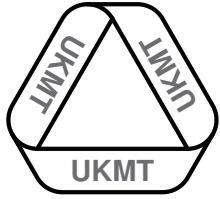
# B9

A mathematical grandmother bakes a huge batch of biscuits for her grandchildren. On Saturday they eat  $\frac{2}{5}$  of the biscuits, on Sunday they eat 85% of the rest, and then just 9 biscuits remain.

How many biscuits were in the batch?

ANSWER:





UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

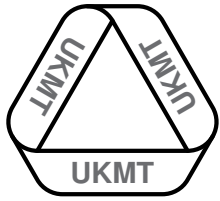
# B10

A renard is a Thai musical instrument made from nine wooden bars. The shortest bar is 20 cm long. The length of each bar is 1 cm longer than the previous one. The bars are cut from strips of wood that are 30 cm in length.

What total length of wood is wasted?

ANSWER:

cm



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

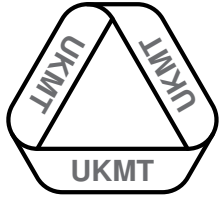
# B11

The figure shows a partially completed magic square.

|     |     |     |
|-----|-----|-----|
|     |     | 3.6 |
|     | 3.0 | 4.2 |
| 2.4 |     |     |

What number goes in the shaded cell?

ANSWER:

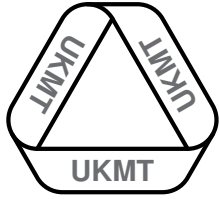


UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B12

Two of the angles of a kite are  $75^\circ$  and  $85^\circ$ .  
What is the largest possible remaining angle?

ANSWER:



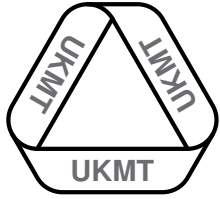
UKMT  
TEAM MATHS  
CHALLENGE  
2014  
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FINAL  
RELAY

# B13

Sixty students are studying French or German or both languages.  
80% study French and 75% German.

How many students study both languages?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014

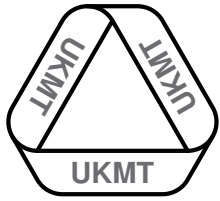
REGIONAL  
FINAL  
RELAY

# B14

A student in the 45-minute group round of a Regional Final spent 12 minutes talking, 20 minutes writing, 8 minutes checking and the rest staring into space.

When this information is drawn on a pie chart, what is the angle for 'staring into space'?

ANSWER:



UKMT  
TEAM MATHS  
CHALLENGE  
2014  
REGIONAL  
FINAL  
RELAY

# B15

The coordinates of two of the vertices of a rhombus are  $(2, 3)$  and  $(6, 1)$ . One of the diagonals has the equation  $x + y = 7$ .

What are the coordinates of the other two points?

ANSWER: