

**A1**

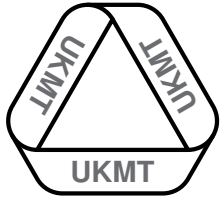
Calculate the value of  $1^1 \times 2^2 \times 3^3$ .

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:



# A2

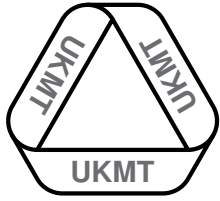
TEAM MATHS  
CHALLENGE  
2014  
NATIONAL  
FINAL  
RELAY

One machine made 70 bricks per hour and then its rate was increased by 5%.

Another machine made 80 per hour and then its rate was decreased by 5%.

What is the new mean rate of the two machines?

ANSWER:



# A3

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

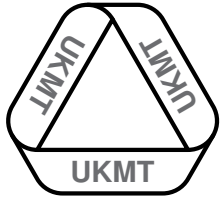
Nicky walks at 4 km/h towards a café 6 km away.

Her cyclist friend, Rachel, who rides at 10 km/h sets off an hour later.

How long does Nicky have to wait for Rachel to arrive at the café?

ANSWER:

mins



TEAM MATHS  
CHALLENGE  
2014

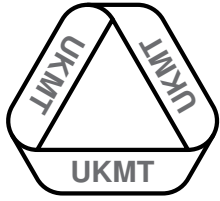
NATIONAL  
FINAL

RELAY

A set of six solid shapes contains various prisms and pyramids.  
There is one of each with a triangular base, a square base and a hexagonal base.

How many triangular faces do these solids have between them?

ANSWER:



# A5

TEAM MATHS  
CHALLENGE  
2014

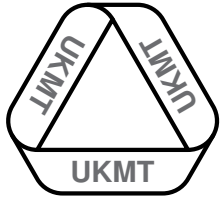
NATIONAL  
FINAL

RELAY

A recent study of animals' sleeping habits showed that the ant had 253 naps a day, with an average time of 1.1 minutes for each nap. To the nearest hour, how long is the ant awake in a 24 hour period?

ANSWER:

hours



# A6

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

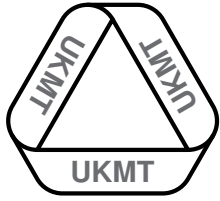
RELAY

The coordinates of the vertices of a square are  $A(2,3)$ ,  $B(5,4)$ ,  $C(6,1)$  and  $D(3,0)$ .

The square is rotated  $180^\circ$  about  $B$ .

What are the coordinates of the image of  $C$ ?

ANSWER:



TEAM MATHS  
CHALLENGE  
2014

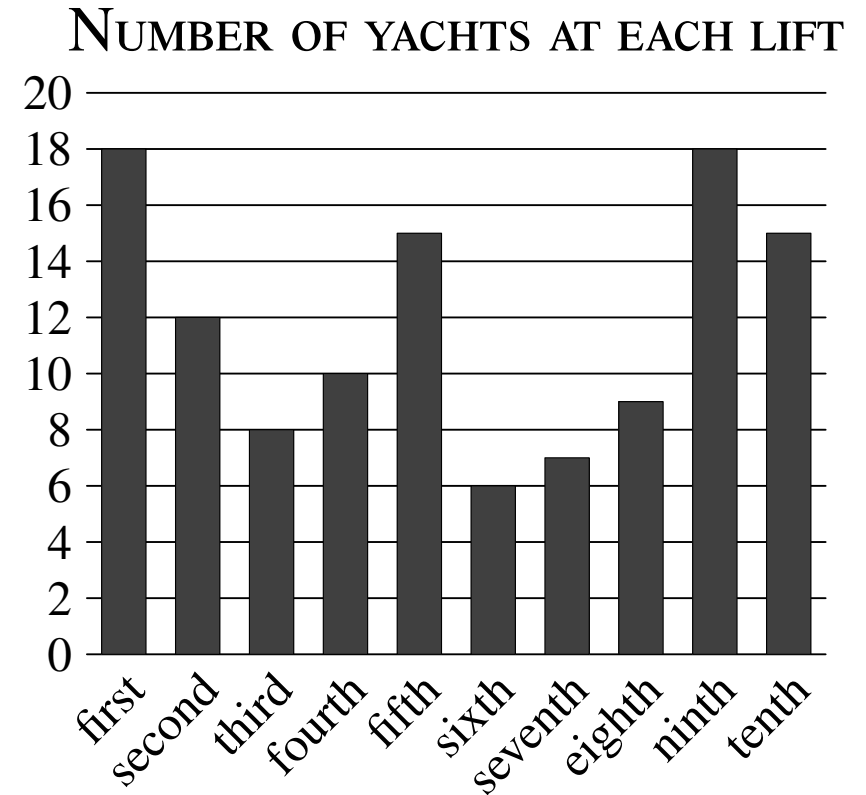
NATIONAL  
FINAL

RELAY

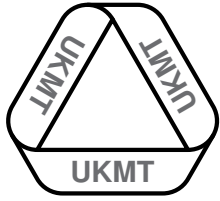
The bridge over the River Pi lifts up to let yachts out of the marina.

Jack recorded the number of yachts leaving at each lift. He made a mistake in the seventh value; he should have recorded another 2 yachts.

What is the mean number of yachts per lift?



ANSWER:



# A8

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

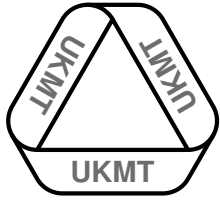
RELAY

Every Christmas Harry and Martha share a tin of 24 sweets in the ratio of their ages. Last year they were 4 and 2 years old respectively.

What is the difference between Harry's number of sweets last year and this year?

ANSWER:





**A9**

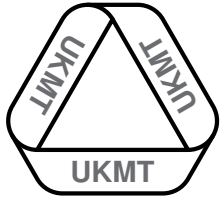
Find a four-digit number divisible by 7, 11 and 13 with a digit sum of 12.

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:



# A10

Find the sum of  $M$  and  $N$  in this magic square.

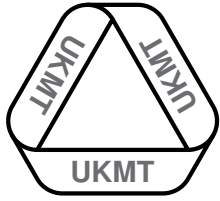
$M$	$-4$		$-5$
	$N$	$-2$	$5$
$-6$		$-3$	$6$
	$-1$		$-8$

ANSWER:

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY



# A11

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

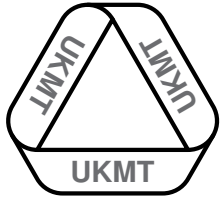
My friend and I calculate the petrol consumption of a journey which he says uses 8 litres for 100 km.

What should I say (to the nearest mile) in miles per gallon?

*[Use 8 km  $\approx$  5 miles and 1 gallon  $\approx$  4.5 litres.]*

ANSWER:

mpg



# A12

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

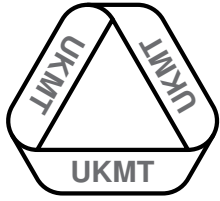
RELAY

A set of axes is drawn on paper with centimetre squares.

What is the area of the triangle whose vertices have coordinates  $(3, 2)$ ,  $(5, 7)$  and  $(4, 2)$ ?

ANSWER:

$\text{cm}^2$



# A13

I save 48p by buying a £6 bag of 24 oranges instead of 24 individual oranges.

What is the cost of one orange if bought on its own?

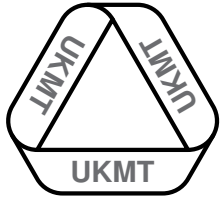
TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:

p



# A14

Nicky, Steve and Rachel share 45 sweets.

Rachel has seven fewer than Nicky, but one more than Steve.

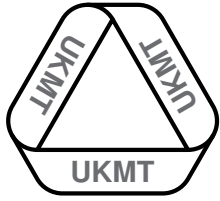
What fraction of the sweets are Nicky's?

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:



# A15

Nicole Kidman was born on 20th June 1967 in Hawaii.

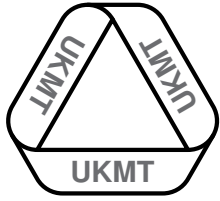
How many full weeks has she been alive?

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:



# B1

Syd buys bags of crisps at ten bags for £1 and sells them at six for £1.

How many bags of crisps must he sell to make a profit of £10?

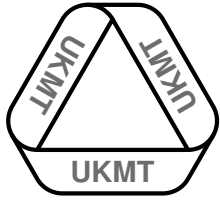
TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:





# B2

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

When these points are plotted on a graph, which one is not on the same straight line as the others?

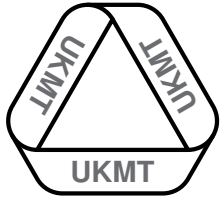
$(2, 5)$

$(4, 9)$

$(0, 3)$

$(3, 7)$

ANSWER:



# B3

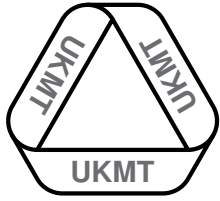
Calculate the value of  $2^0 \times 3^1 \times 4^2$ .

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER:



# B4

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

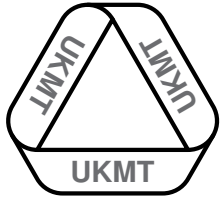
A boat is motoring upstream, moving at 20 km/h through the water.

The river is flowing downstream at 5 km/h.

How long does the boat take to travel between two bridges 3 km apart?

ANSWER:

mins



# B5

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

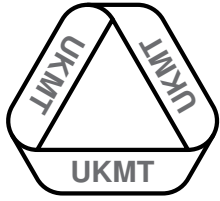
RELAY

In Becky's computer game she gets five points for hitting a target, but loses seven points if she misses.

After 50 shots her score is 70.

How many targets did she hit?

ANSWER:



# B6

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

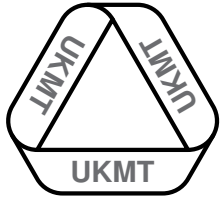
RELAY

A set of six solid shapes contains various prisms and pyramids.

There is one of each with a triangular base, a square base and a hexagonal base.

How many quadrilateral faces do these solids have between them?

ANSWER:



# B7

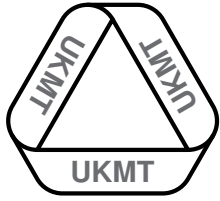
TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

A mathematical grandmother has coins of five different denominations in her purse and gives them all to her grandchildren. Each child gets the same number of coins of each denomination. She has £4.15 in her purse. How many grandchildren does she have?

ANSWER:



# B8

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

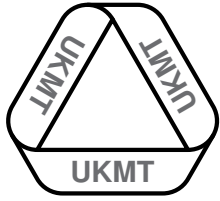
RELAY

The coordinates of the vertices of a triangle are  $A(2,3)$ ,  $B(5,4)$  and  $C(6,1)$ .

The triangle is translated so that the image of  $A$  is at  $B$ .

What are the coordinates of the image of  $C$ ?

ANSWER:



TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

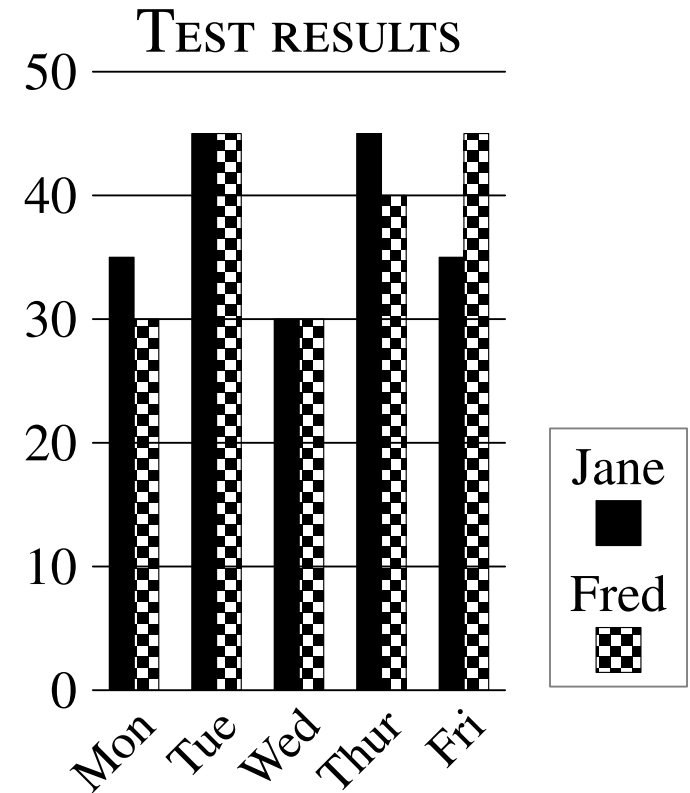
RELAY

# B9

The teacher has recorded Fred and Jane's test results for one week, on a chart, rounding the results to the nearest five. All the original marks were integers.

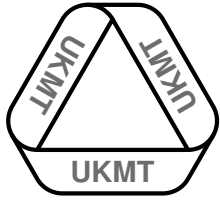
All of Fred's results were rounded up while all of Jane's were rounded down, both by the maximum possible number of marks.

What is the difference in their real totals for the week?



ANSWER:





# B10

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

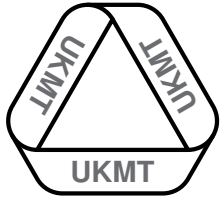
RELAY

While cycling, Bradley had a flat tyre after he had completed  $\frac{2}{3}$  of the distance.

He walked the rest of the way, spending twice as long walking as he did riding.

What is the ratio of cycling speed to walking speed?

ANSWER:



# B11

Bananas cost 12p each in the café, but I can buy a box of 18 and save 16 pence.

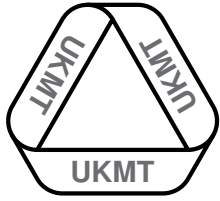
How much will 5 boxes cost?

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

ANSWER: £



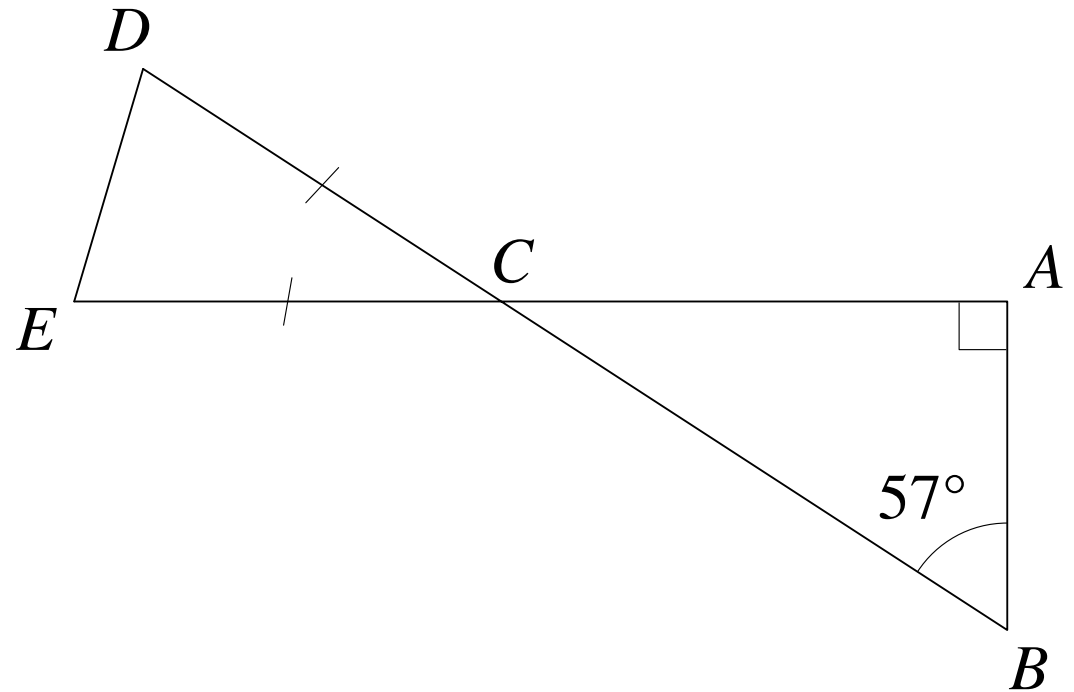
# B12

TEAM MATHS  
CHALLENGE  
2014

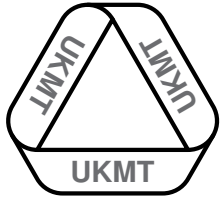
NATIONAL  
FINAL

RELAY

Angle  $A$  is  $90^\circ$   
and  $CD = CE$ .  
Angle  $B$  is  $57^\circ$ .  
Find  $\angle DEC$ .



ANSWER:



# B13

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

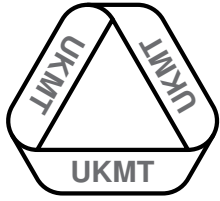
RELAY

The volume of a square-based cuboid is  $8.45 \text{ cm}^3$ , and its height is 5 cm.

What is the length of one side of the square base?

ANSWER:

cm



# B14

Find the sum of  $P$  and  $Q$  in this magic square.

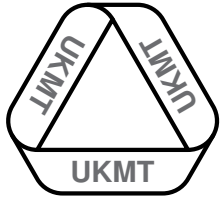
2	12	13	-1
	5	4	
3	$P$		6
$Q$		7	

ANSWER:

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY



# B15

TEAM MATHS  
CHALLENGE  
2014

NATIONAL  
FINAL

RELAY

An early mathematician, Bhaskhara II, was born in 1114.

This is a simplified version of one of his problems.

What is the smallest positive integer which, when it is multiplied by 13 and 3 is added to the product, gives an answer that is a multiple of 17?

ANSWER: