UKMT Team Maths Challenge 2013
National Final - Relay Race

A1

When written in DD/MM/YYYY form, 21st March 2013 (21/03/2013) uses each of the digits 0,1,2 and 3 twice. What is or was the first date this year that has this property?

Answer / /

A2

I pour half a litre of paint into a rectangular tray 10cm by 20cm.

How deep is the paint?

Answer	cm

A3

Eight friends go to a café for lunch. They can have one course at £6.45 or two courses at £9.95. The bill comes to £62.10. How many of the friends had two courses?

Answer

A4

Calculate the value of X:

$$8 \times X + 15 \div 5 = 11 + 6 \times 8$$

Answer

A5

Calculate the total of all the square numbers less than 40.

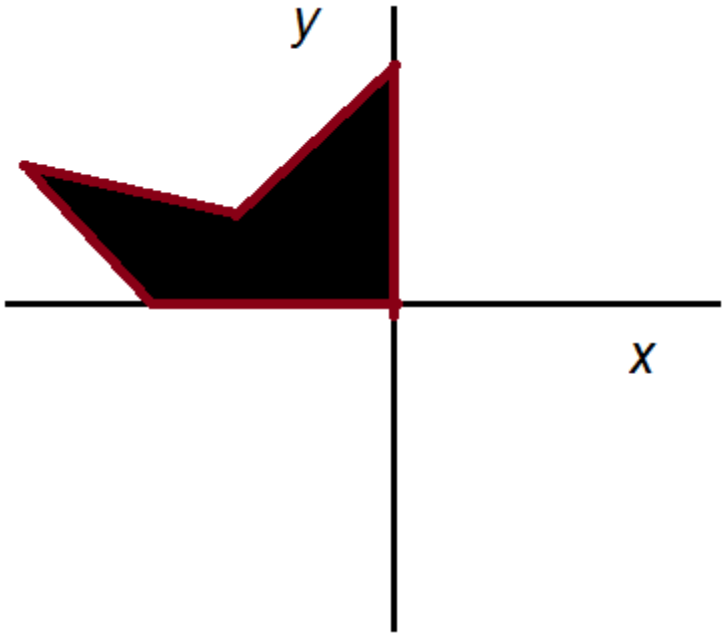
Answer

A6

Martha counts up all the money in her piggy bank, and finds she has £3.64. She has equal numbers of just four different coins, each worth less than 50p. How many does she have of each coin?

Answer

A7



Reflect this irregular pentagon in the *x*-axis and name the new shape.

Answer

A8

Two of the angles of an isosceles triangle are in the ratio 2:5.

What is the largest possible angle in such a triangle?

Answer °

A9

A volleyball team has three strips (shorts, tee-shirts and headband) all white, all black and all red. The sponsor agrees that they can mix up the strips provided they do not wear the same colour headband as shorts. How many different outfits can they make?

Answer

A10

What is the median of ALL of the factors of 2013?

Answer

A11

A mole starts burrowing horizontally.

He goes 4 metres West, 2 metres North, 1 metre East and 6 metres South. How far is he from his start point?

Answer metres

A12

A rectangle 16cm wide and 25cm long has the same area as a square.

What is the ratio of the perimeter of the square to the perimeter of the rectangle?

Answer

A13

A young farmer calculates that the mean number of eggs laid by each of his five hens last week is six. He then finds Esmeralda (one of the five hens) sitting on an extra secret clutch of four eggs behind a bush. What is the mean now?

Answer eggs

A14

Three of the vertices of a parallelogram are at the points (8,5), (5,4) and (5,8).

Give the coordinates of the three possible positions of the fourth vertex.

Answer , and

A15

A slug and a snail finish eating a lettuce in my garden and then set off together at their top speeds towards a cabbage 3 metres away. The speedy slug travels at 2.5 metres/hour, the slower snail at 2 metres/hour. How many minutes of cabbage-eating does the slug have before the snail joins her?

Answer	mins

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B1

Calculate the product of all the single-digit prime numbers.

Answer

B2

A rectangle 10cm long has the same perimeter as a square of side 6cm.

What is the ratio of the area of the square to the area of the rectangle?

Give your answer in lowest terms.

Answer

B3

Harry counts up all the money in his piggy bank, and finds he has £1.85. He has equal numbers of just four different coins, each worth less than 50p. How many does he have of each coin?

Answer

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B4

When written in DD/MM/YYYY form, 21st March 2013 (21/03/2013) uses each of the digits 0,1,2 and 3 twice. What will be the last date this year that has this property?

Answer / /

B5

A mole starts burrowing horizontally.

He goes 6 metres West, 1 metre North, 3 metres East and 4 metres South. In which compass direction must he dig to return to his start point?

Answer

B6

In a mathematics class of 36 pupils the ratio with long hair (more than shoulder length) to short hair (less than shoulder length) is 8:1. When four more join the class the ratio changes to 7:1. Now how many have long hair?

Answer

B7

The pipkin is a traditional small barrel holding seven pints of beer. Approximately how many litres of beer will fill 6 pipkins?

(1 litre is approximately a pint and three-quarters.)

Answer	litres

B8

Two of the vertices of a rectangle are at the points (8,5) and (4,1). One line of symmetry is $x = 6$. What is the equation of the other line of symmetry?

Answer

B9

Calculate the value of X:

$$7 \times 9 - 13 \times 2 = 5 \times X + 2$$

Answer

B10

A mathematical grandmother makes a round cake, but only has a recipe for an eight inch square cake. She has four round cake tins with diameters 7, 8, 9 and 10 inches.

Which round tin will give a cake nearest to the same height as the square tin?

Answer	inches

B11

Three poles are tied together to make one long pole exactly 4 metres long. The three poles are 1m, 2m and 1·5m long. If the overlap is the same for each join, what is that overlap in cm?

Answer cm

B12

The restaurant deal was: two courses for £9.95 or three courses for £14.45. At the end of the meal six friends received a bill for £68.70.

How many had just two courses?

Answer

B13

A group of friends set out each week to complete a five-mile walk. After eight walks they calculate that their mean walk is 5·15 miles, so they plan to take it easy next week with a shorter walk to return the mean length to 5 miles. How far must they walk?

Answer miles

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B14

What is the mean of ALL of the factors of 2013?

Answer

B15

After a Team Maths Challenge, 80 students were asked which was their favourite round. Twice as many said Group as said Relay. Five more said Crossnumber than Relay, and three fewer said Mini Relay than Crossnumber. Twelve said Mini Relay.

How many did not have a favourite?

Answer