

UKMT Team Maths Challenge

Round One Relay Race

Question 1

Mrs Thwaites is buying Christmas presents for her six children to give to one another. Each child gives a present to each of the others.

How many presents must she buy?

Question 2

There is the same number of desks in each row in a classroom and the rows are straight. Bronwyn's desk is third from the front, and third from the back. It has one desk to its left and five to the right.

How many desks are there in the room?

Question 3

What am I? I am a two-digit number.

The number minus the sum of its digits equals 36.

The sum of the digits plus the product of the digits equals 39.

Question 4

By drawing a diagram, show how six matchsticks can be arranged so that each stick touches all the others.

Question 5

It is possible to have a triangle whose angle sizes (in degrees) are three square numbers.

What are these angle sizes?

Question 6

A cube with sides of length 24cm is half full of water. A solid steel cube with side lengths of 12cm sinks into the water.

What is the rise in the level of the water?

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Question 7

In this addition sum each letter stands for a single digit (i.e. same letter = same value) and E=5. Find the value of D.

$$\begin{array}{r} \text{SEND} + \\ \text{MORE} \\ \hline \text{MONEY} \end{array}$$

Question 8

Terry and Geoff have to catch the 6pm train.

Terry's watch is 10 minutes fast but he thinks that it is 5 minutes slow.

Geoff's watch is 10 minutes slow but he thinks it is 5 minutes fast.

Each, thinking as he does, leaves to catch the train so that he will just make it.

Who misses the train and by how much?

Question 9

Find two numbers whose sum is 1 and product is $\frac{4}{25}$

Question 10

A jogger runs the one kilometre from her home to the shop at 12km/h. When she gets there she finds it closed and walks back home at 4km/h.

What is her average speed?

Question 11

You may have seen that $3^2 + 4^2 = 5^2$

Find five consecutive numbers a,b,c,d,e which make the following equation true:

$$a^2 + b^2 + c^2 = d^2 + e^2$$

Question 12

A customer asks for 420cm of wire. The shop assistant measures this out with a ruler that appears to be a metre long but in fact is only 95cm long. How much wire did the customer pay for but not receive?

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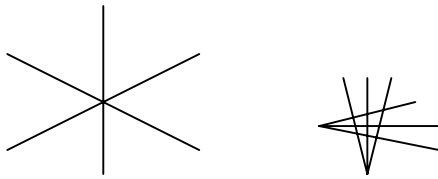
Round One Relay Race

1 30 (presents)

2 35 (desks)

3 47

4



5 16° , 64° , 100°

6 3 (cm)

7 (D =) 7

8 Geoff misses the train by 15 minutes

9 $\frac{4}{5}$, $\frac{1}{5}$

10 6 (km/h)

11 $a = 10$, $b = 11$, $c = 12$, $d = 13$, $e = 14$

12 21 (cm)