# Instructions

- Your team will have 45 minutes to answer 10 questions. Each team will have the same questions.
- Each question is worth a total of 6 marks. However, some questions are easier than others!
- Do not spend too long on any one question without sharing it with the rest of the team.
- You will have to decide your team's strategy for this group competition.
- There is only one response sheet per team.
- Don't forget to finalise your answers and write them on the response sheet before the end of the round.

# QUESTION 1

The mean age of four pupils, on the date of a TMC Regional Final they had been entered for, was 14 years 2 months.

Their teacher realised that this date clashed with school holidays and changed their entry to take place exactly two months later.

Unfortunately, this meant that one of the pupils could no longer participate and a younger replacement was found.

The mean age of the revised team of four pupils, on the new entry date, was 13 years 11 months.

How many months older is the original entrant than the younger replacement?

[6 marks]

# QUESTION 2

(a) What is the smallest sum of three *different* prime numbers, each of which is the sum of two *different* prime numbers?

[3 marks]

(b) What is the smallest sum of three *different* prime numbers, each of which is the sum of three *different* prime numbers?

[3 marks]

# QUESTION 3

The vowels A, E, I, O and U are coded by the squares 1, 4, 9, 16 and 25 respectively.

The consonants B, C, D, . . . , X, Y and Z are coded by the integers less than or equal to 26 that are not squares, in reverse. So B = 26, C = 24, D = 23, . . . , X = 5, Y = 3 and Z = 2.

(a) Decode the message

| |
|---|
| 20 16 6 1 11 4 3 16 25 |

[3 marks]

(b) Decode the message

| |
|---|
| 7 4 11 3 6 4 17 17 8 20 1 14 18 10 |

[3 marks]

# QUESTION 4

In an isosceles trapezium $ABCD$, the lines $BC$ and $AD$ are parallel and $AB = CD$.

The point $E$ lies on $DA$ such that

$$AB = BE$$
$$\text{and} \quad \angle BCD = 3 \times \angle CDE.$$

What is the value of $\angle ABE$ in degrees?

[6 marks]

# QUESTION 5

In the following equation, $a$, $b$ and $c$ are different digits, and '$bc$' and '$cb$' are two-digit numbers.

$$a \times \text{`}bc\text{'} \times \text{`}cb\text{'} = 2015$$

What is the value of $a + b + c$?

[6 marks]

# QUESTION 6

Andrew drove one and a half miles to work and then walked back home at a tenth of his average driving speed.

The two journeys lasted a total of 33 minutes.

What was Andrew's average walking speed in mph?

[6 marks]

# QUESTION 7

At a puzzle conference 68% of those attending enjoyed doing crosswords and 39% enjoyed doing Sudoku.

Only 3% of those attending the conference did not enjoy either doing crosswords or doing Sudoku.

What percentage of those attending the conference enjoyed both of these activities?

[6 marks]

# QUESTION 8

The order of the digits is reversed in a certain two-digit whole number.

This gives a new whole number which is one less than half of the original number.

What is the original number?

[6 marks]

# QUESTION 9

A rectangle $ABCD$ is cut into two regions by a single straight line from the corner $B$ to a point $E$ on the opposite side $AD$.

Let the length of $AE$ be $x$ cm and let the length of $DE$ be $y$ cm.

(a) The areas of the regions $ABE$ and $BCDE$ are in the ratio $1 : 2$.

What is the ratio $x : y$?

[3 marks]

(b) Suppose the ratio $x : y$ is changed to $6 : 5$.

What is the ratio

area of triangle $ABE$ : area of quadrilateral $BCDE$?

[3 marks]

# QUESTION 10

A woman says to her brother "I am four times as old as you were when I was the same age as you are now."

The woman is 40 years old.

How old is her brother now?

[6 marks]

TEAM NUMBER SCHOOL NAME

**1.** Difference in ages

months 0 6

**2.** (a) sum of 3 primes (b) sum of 3 primes

(a) 0 3

(b) 0 3

**3.** (a) decoded message (b) decoded message

(a) 0 3

(b) 0 3

**4.** Value of $\angle ABE$

degrees 0 6

**5.** Value of $a + b + c$

0 6

**6.** Average walking speed

mph 0 6

**7.** Percentage who enjoyed both

% 0 6

**8.** Original number

0 6

**9.** (a) $x : y$ (b) the ratio of the areas

(a) 0 3

(b) 0 3

**10.** Brother's age

years 0 6

Circle the mark awarded for each question and cross out the others.

FINAL SCORE /60