

## 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.
- Remember to finalise your answers and write them on the response sheet before the end of the round.

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## QUESTION 1

- (a) The  $m$ th triangular number is a square greater than 1.

What is the smallest possible value of  $m$ ? [3 marks]

- (b) When the names of the first  $n$  positive integers are spelt in letters, the vowels  $A$ ,  $E$ ,  $I$ ,  $O$  and  $U$  each occur at least once.

What is the smallest possible value of  $n$  for which this occurs?  
[3 marks]

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## QUESTION 2

A solid cuboid has faces with surface areas of 48, 72 and 96 square centimetres.

What is the volume of the cuboid? Give your answer in cubic centimetres.

[6 marks]

## QUESTION 3

- (a) A one-digit prime is placed in each cell in the Crossnumber below.

ACROSS	DOWN	
1. A prime	1. A prime	1
3. A prime	2. A prime	2
		3

What is the *smallest* possible sum of the four one-digit primes?  
[2 marks]

- (b) A one-digit prime is placed in each cell in the Crossnumber below.

ACROSS	DOWN	
1. A prime	1. A prime	1
3. A prime	2. A prime	2
		3

What is the *greatest* possible sum of the four one-digit primes?  
[2 marks]

- (c) A one-digit prime is placed in each cell in the Crossnumber below.

ACROSS	DOWN	
1. A prime	1. A prime	1
3. A prime	2. A prime	2
		3

What is a *different* possible sum, from that in (a) and (b), of the four one-digit primes?

[2 marks]

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## QUESTION 4

When seven is subtracted from a certain three-digit number the result is divisible by seven.

When eight is subtracted from the same three-digit number the result is divisible by eight.

When nine is subtracted from the same three-digit number the result is divisible by nine.

What is the three-digit number?

[6 marks]

## QUESTION 5

A room contains a group of Minions. Each Minion has either one eye or two eyes.

In the room, there are three times as many Minions with two eyes as there are with one eye.

In total there are 329 eyes in the room.

How many Minions in the room have two eyes?

[6 marks]

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## QUESTION 6

Dean has six coins. The largest amount he is able to make with five of the coins is £4.60. The smallest amount he is able to make with five of the coins is £2.70.

What is the total value, in pounds, of Dean's six coins?

[6 marks]

## QUESTION 7

- (a) At Sports Day, Class 9A competed in a  $4 \times 100$  m relay.

Their fastest runner took 15 seconds to run 100 m.

Class 9A started with their fastest runner. Their second runner took  $\frac{4}{3}$  as long as their first runner, their third runner took  $\frac{4}{5}$  as long as their second runner and their last runner took  $\frac{5}{4}$  as long as their third runner.

How many seconds did Class 9A take to complete the relay?

[3 marks]

- (b) At Sports Day, Class 9B competed in a  $4 \times 100$  m relay.

Their fastest runner took 15 seconds to run 100 m.

Class 9B finished with their fastest runner. Their second runner took 1 second longer than their first runner, their third runner took  $\frac{10}{9}$  as long as their second runner and their last runner took  $\frac{3}{4}$  as long as their third runner.

How many seconds did Class 9B take to complete the relay?

[3 marks]



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## QUESTION 8

The year 1978 had a special feature.

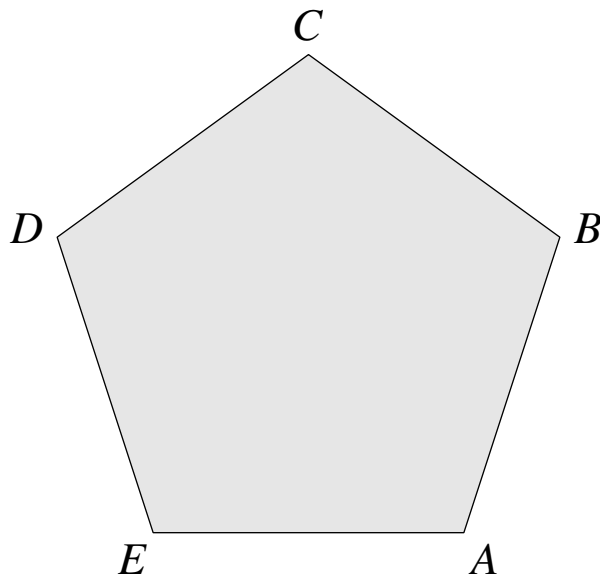
When you add the number formed by the first two digits to the number formed by the last two digits, the result is equal to the number formed by the middle two digits ( $19 + 78 = 97$ ).

Find the next year that has this special feature and has no zero digits within it.

[6 marks]

## QUESTION 9

$ABCDE$  is a regular pentagon.



Angle  $ACE$  is  $x^\circ$ .

Angle  $DBA$  is  $y^\circ$ .

Angle  $DCB$  is  $z^\circ$ .

Find the ratio  $x : y : z$ .

Give this ratio in lowest terms.

[6 marks]

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## QUESTION 10

- (a) Each of the letters from  $A$  to  $E$  represents a different digit from 1 to 5 in some order.

$$'AB' \times C = 'DE'.$$

What is the value of  $'DE'$ ? [3 marks]

- (b) Each of the letters from  $K$  to  $N$  represents a digit from 0 to 9 in some order.

Each letter represents a different digit.

$$'KLMN' \times N = 'NMLK'.$$

What is the value of  $'NMLK'$ ? [3 marks]

TEAM NUMBER 

SCHOOL NAME 

**1.** (a) Value of  $m$  (b) Value of  $n$

(a) (0) (3)

(b) (0) (3)

**6.** Total value

(0) (6)

**2.** Volume of the cuboid

$\text{cm}^3$  (0) (6)

**7.** (a) Seconds for 9A (b) Seconds for 9B

(a) (0) (3)

(b) (0) (3)

**3.** (a) Smallest (b) Greatest (c) Different sum

(a) (0) (2)

(b) (0) (2)

(c) (0) (2)

**8.** Year

(0) (6)

**4.** Three-digit number

(0) (6)

**9.** Ratio of angles

(0) (6)

**5.** Number of Minions with two eyes

(0) (6)

**10.** (a) 'DE' (b) 'NMLK'

(a) (0) (3)

(b) (0) (3)

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

FINAL SCORE /60 