

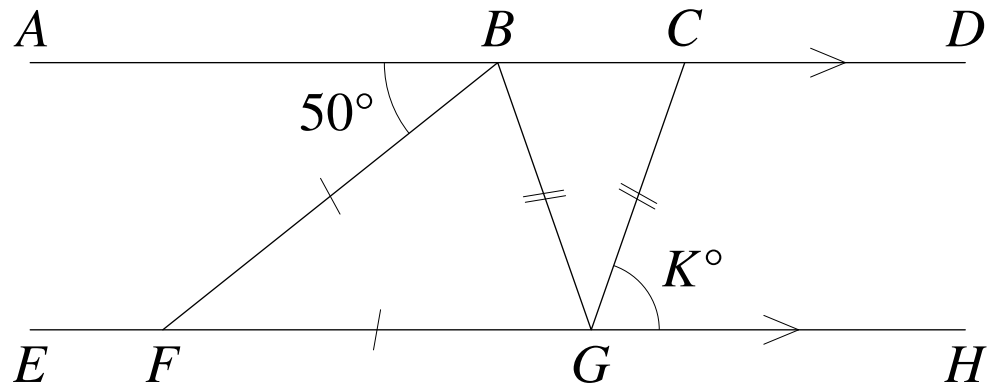
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# A1

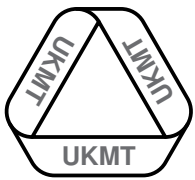
In the diagram, lines  $AD$  and  $EH$  are parallel. The lengths of  $FB$  and  $FG$  are equal and the lengths of  $BG$  and  $GC$  are equal. Angle  $ABF$  is  $50^\circ$ .



Angle  $CGH = K^\circ$ .

Pass on the sum of the digits of  $K$ .

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# A3

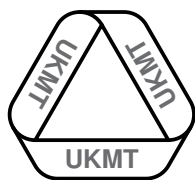
$T$  is the number you will receive.

Solve the equation

$$2T(x - 5) - 3(T + 1 - x) = 5(2x - 3) - 2(x + 3T).$$

Pass on the value of  $x$ .

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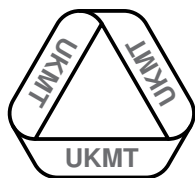


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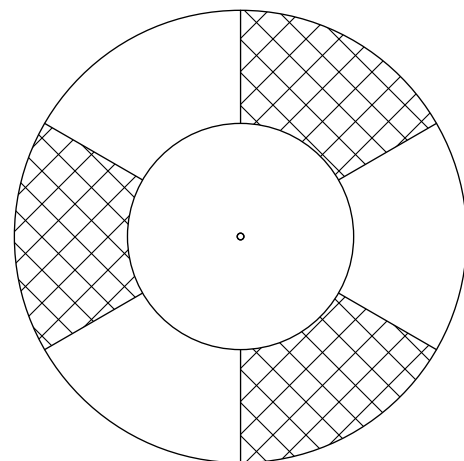
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**A2**

*T* is the number you will receive.

The diagram shows a circle of radius  $(T + 1)$  cm and a smaller circle of radius 4 cm, with the same centre. The area between the circles is divided into six equal regions.



The shaded area is  $k^2\pi$  cm<sup>2</sup>.

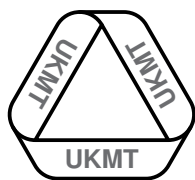
Pass on the value of  $k$ .

**A4**

*T* is the number you will receive.

The expression  $12^{T+1} \times 30^{T-1}$  can be written as  $2^a \times 3^b \times 5^c$ , where  $a$ ,  $b$  and  $c$  are integers.

Write down the value of  $a + b + c$ .

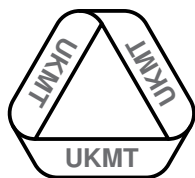


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# B1

$U$  is a prime number,  $K$  is a cube,  $M$  is a square and  $T$  is a triangular number.

$U, K, M$  and  $T$  are all different and smaller than 10.

Also,  $U \times K = M \times T$ .

Pass on the value of  $U + K + M + T$ .

# B3

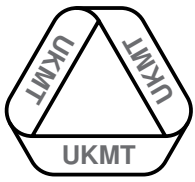
$T$  is the number you will receive.

The mean of these numbers (which are in ascending order)

4, 6, $T$ , $T + 2$ , 14, $x$
-------------------------------

is three times the median.

Pass on the value of  $\frac{x}{10}$ .

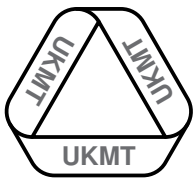


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**B2**

$T$  is the number you will receive.

The first two terms of a sequence are 3 and 1, respectively, and then each successive term is the sum of the previous two.

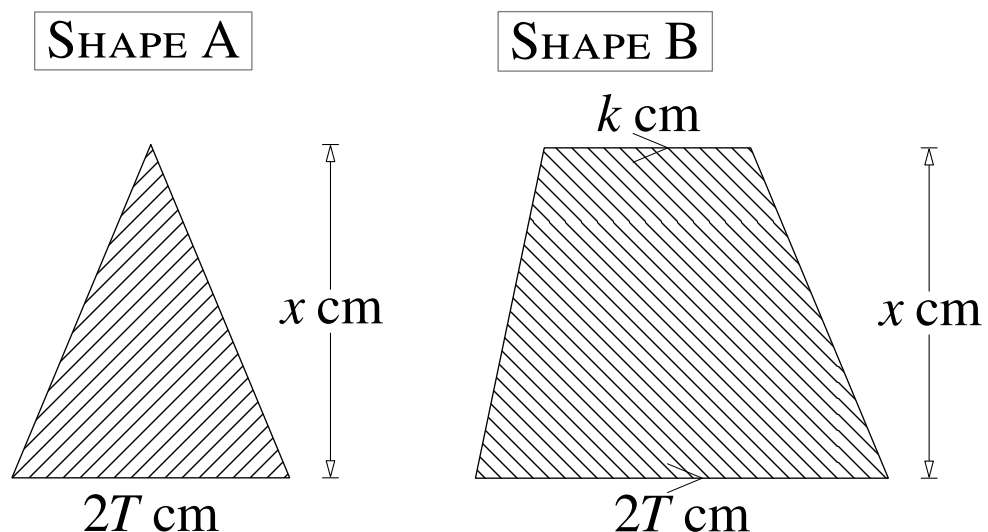
The  $T$ th term ends in the digit  $k$ .

Pass on the value of  $k$ .

**B4**

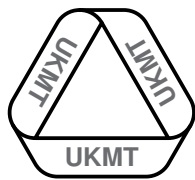
$T$  is the number you will receive.

The ratio of the area of shape  $A$  to the area of shape  $B$  is 3 : 4.



Write down the value of  $k$ .

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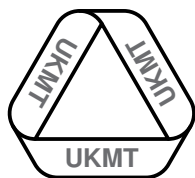


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# C1

Pass on the value of

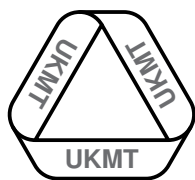
$$\left(1 - \frac{1}{2}\right)\left(2 - \frac{2}{3}\right)\left(3 - \frac{3}{4}\right)\left(4 - \frac{4}{5}\right)\left(5 - \frac{5}{6}\right)$$

# C3

*T* is the number you will receive.

$$\text{Let } U = \frac{1}{K-1}, K = \frac{1}{1-M}, \text{ and } M = \frac{1}{T-1}.$$

Pass on the value of *U*.

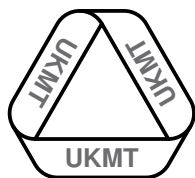


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**C2**

$T$  is the number you will receive.

Candy started the week with  $T$  sweets.

On Monday she ate a quarter of them.

On Tuesday she chomped a fifth of the remainder.

On Wednesday she gulped down a third of what was left.

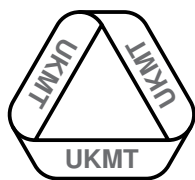
This left Candy with  $S$  sweets for the rest of the week.  
Pass on the value of  $S$ .

**C4**

$T$  is the number you will receive.

Anthony the ant leaves his home in the Sahara Desert and walks 2.5 metres north, then 4 metres east, before stumbling  $T$  metres south, and finally 16 metres west.

Write down how many metres Anthony is now from home.

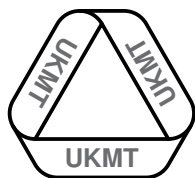


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# D1

Melody had a cube of side length 4 cm. From the centre of each face she cut out a cube of side length 1 cm, resulting in a solid shape with volume  $58 \text{ cm}^3$ .

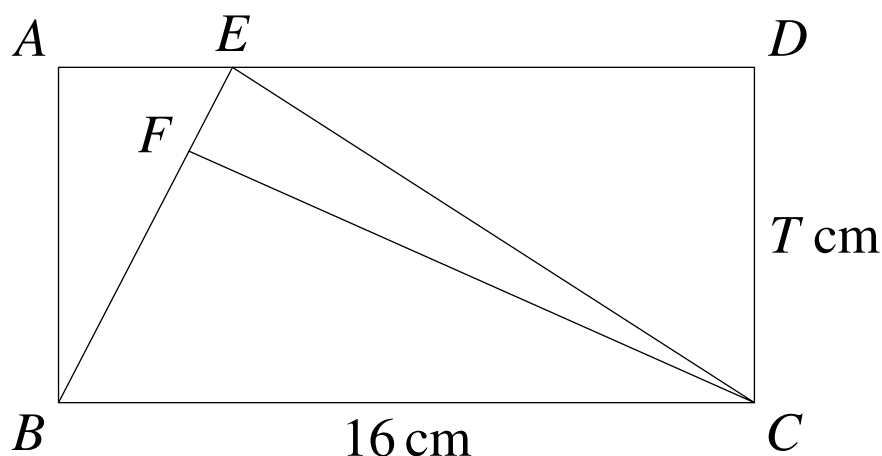
The total surface area of her solid shape is now  $K \text{ cm}^2$ .

Pass on the value of  $\frac{K}{10}$ .

# D3

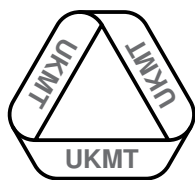
*T* is the number you will receive.

The diagram below shows a rectangle  $ABCD$ . The ratio  $EF:FB$  is  $1 : 3$ .



The area of triangle  $CEF$  is  $K \text{ cm}^2$ .

Pass on the value of  $K$ .

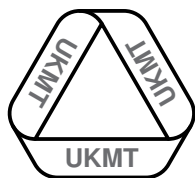


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**D2**

*T* is the number you will receive.

In a certain class, 75% of those who like tofu are vegetarian, but only half of those who are vegetarian like tofu.

$T\%$  of the class like tofu, and  $K\%$  of the class is vegetarian.

Pass on the value of  $K$ .

**D4**

*T* is the number you will receive.

Karloff is exactly  $T$  years old.

When a third of Karloff's age is added to half of Boris's age, the result is the difference between Boris's and Karloff's ages.

Write down the youngest that Boris could be.



TEAM NUMBER

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<p><b>A1</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>B1</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>C1</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>D1</b></p> <p style="text-align: right;">0 1 3</p>
<p><b>A2</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>B2</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>C2</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>D2</b></p> <p style="text-align: right;">0 1 3</p>
<p><b>A3</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>B3</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>C3</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>D3</b></p> <p style="text-align: right;">0 1 3</p>
<p><b>A4</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>B4</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>C4</b></p> <p style="text-align: right;">0 1 3</p>	<p><b>D4</b></p> <p style="text-align: right;">0 1 3</p>

BONUS 3

BONUS 3

BONUS 3

BONUS 3

A TOTAL /15

B TOTAL /15

C TOTAL /15

D TOTAL /15

Circle the mark awarded for each question and cross out the others.  
 At the end of the round, either circle the bonus mark or cross it out.

FINAL SCORE /60