

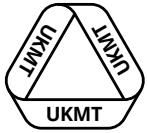
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A1

Pass on the value of

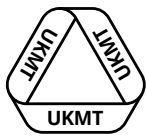
$$2018 - 201 \times 8 - 20 \times 18.$$

A3

T is the number you will receive.

When Grace shares her T sweets between herself and Pete in the ratio 4 : 1, she gets x more sweets than if she were to share them in the ratio 3 : 2.

Pass on the value of x .



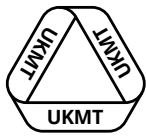
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T is the number you will receive.

A2

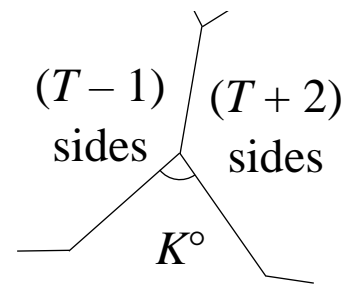
When T is increased by 20%, it gives the same value as when x is decreased by 25%.

Pass on the value of x .

T is the number you will receive.

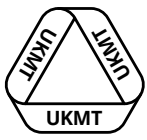
A4

A regular $(T - 1)$ -sided polygon and a regular $(T + 2)$ -sided polygon share an edge externally, as indicated in the diagram.



The angle between the two polygons is K° .

Write down the value of K .



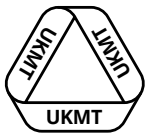
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B1

$$K = \frac{201}{8} - 20\frac{1}{8}.$$

Pass on the value of $K - 1$.

B3

T is the number you will receive.

A tetrahedron has 4 faces and 6 edges.

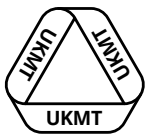
A cube has 6 faces and 12 edges.

A dodecahedron has 12 faces and 30 edges.

Sonia has a collection of T tetrahedrons and D dodecahedrons. Matthew has a collection containing only cubes.

Surprisingly, Sonia's collection and Matthew's collection have the same total number of faces and total number of edges.

Pass on the value of D .



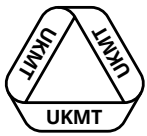
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B2

T is the number you will receive.

$$K = 10^3 + 9^3 + 8^3 - 7^3 + 6^3 - 5^3 + 4^3 - 3^3 - 2^3 + T.$$

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

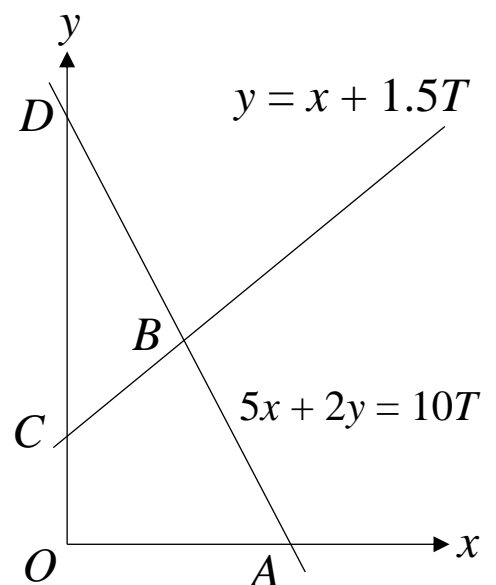
B4

T is the number you will receive.

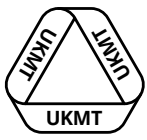
The line $5x + 2y = 10T$ cuts the x -axis at A and the y -axis at D .

The line $y = x + 1.5T$ cuts the y -axis at C .

The two lines intersect at B .



Write down the area of quadrilateral $OABC$.



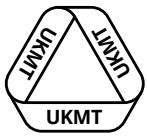
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C1

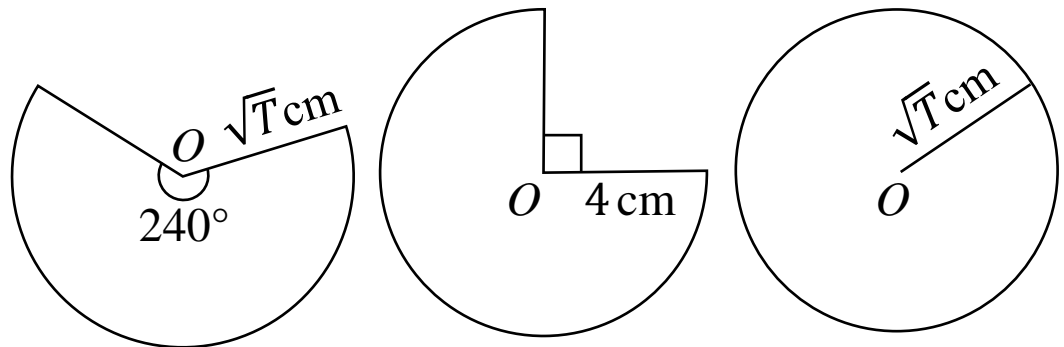
The lowest common multiple of 12, 16 and 18 is K times the highest common factor of 576, 792 and 1008.

Pass on the value of the integer K .

C3

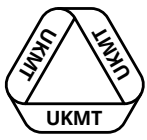
T is the number you will receive.

The diagram below shows two sectors and a circle. Their centres are marked O .



The area of the circle is K times the difference between the areas of the two sectors.

Pass on the value of K .

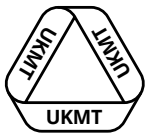


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C2

T is the number you will receive.

The equation

$$T(x - 2) - 4(T - 3x) = 1 - 6(Tx - 13)$$

has a solution $x = \frac{a}{b}$, where a and b are positive integers with no common factor other than 1.

Pass on the value of $a + b$.

C4

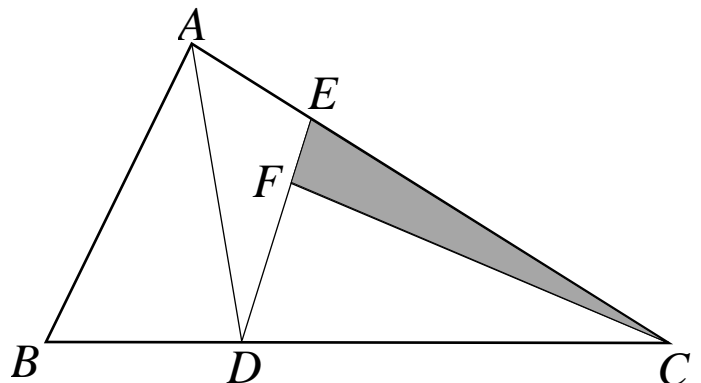
T is the number you will receive.

The diagram shows a triangle ABC .

D divides BC in the ratio $1 : T$.

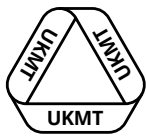
E divides AC in the ratio $1 : 4$.

F divides ED in the ratio $1 : 3$.



The area of the triangle CEF is $P\%$ of the area of the triangle ABC .

Write down the value of P .



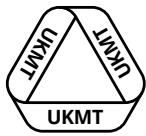
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D1

Zoe rolls two standard six-sided dice, each numbered 1, 2, 3, 4, 5 and 6. She finds the product of the two numbers shown on the dice.

The probability that the product is prime is P .

The probability that the product is a square is S .

Zoe notices that $P + S = \frac{K}{36}$.

Pass on the value of K .

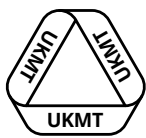
D3

T is the number you will receive.

The operator \clubsuit is defined by $a \clubsuit b = \frac{a + b + ab}{a - b}$.

Pass on the value of y that satisfies the equation

$$18 \clubsuit y = T + 1.$$



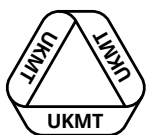
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D2

T is the number you will receive.

Fred has $2T$ counters, $\frac{5}{7}$ of which are red and the rest are blue.

Freda has $2T$ counters, half of which are red and half are blue.

Alfred takes x red and x blue counters from Fred and x red and x blue counters from Freda.

Together, Fred and Freda now have twice as many red counters as blue counters.

Pass on the *total* number of counters taken by Alfred.

D4

T is the number you will receive.



The diagram shows the first three patterns in a sequence. The list of ratios of white triangles to black triangles, written in their lowest terms, begins:
 $1 : 3, \quad 1 : 2, \quad 3 : 5, \quad \dots$

Write down the ratio of white triangles to black triangles, in its lowest terms, for the T th pattern in the sequence.

TEAM NUMBER

SCHOOL NAME

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