Team Maths Challenge 2016

National Final

Shuttle

A1

Pass on the value of:

$-12 \times (11 - 10 - 9) \div (7 - 6 - 5) + 4 \times -3 \times (-2 - 1).$

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National Final

Shuttle

A3

T is the number you will receive.

$3(T - 8)x = 2T(x + 2) - 4(2 - 9x)$

Pass on the value of x.

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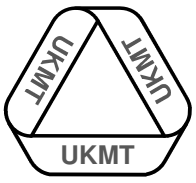

TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

SHUTTLE

T is the number you will receive.

A2

The median of a set of five different positive integers is T.

The mean of the same set of integers is $\frac{T}{2}$ greater than the median.

Pass on the value of the largest possible integer in the set.

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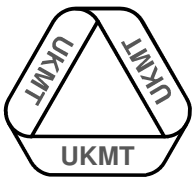

TEAM MATHS CHALLENGE 2016

NATIONAL FINAL

SHUTTLE

T is the number you will receive.

A4

A pot of paint contains enough paint to cover an area of $1800\,\text{cm}^2$.

Write down how many pots of paint are needed to cover the surface of a cuboid with dimensions $\frac{T}{2}$ cm by $\frac{T}{3}$ cm by $\frac{T}{4}$ cm.

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B1

50 Year 9 pupils were asked whether they have a bicycle or a skateboard.

25 said they have a bicycle,
20 said they have a skateboard, and
twice as many said they have neither as said they have both.

Pass on the number of people who said they have a bicycle but not a skateboard.

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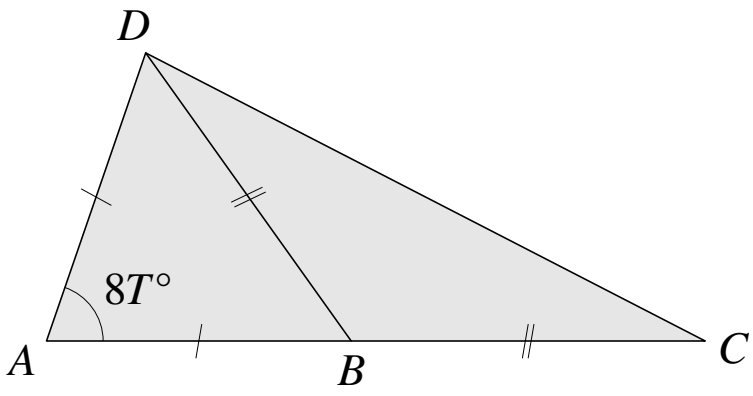
SHUTTLE

B3

T is the number you will receive.

The diagram shows triangle ACD. The point B lies on AC so that $AB = AD$ and $DB = BC$. Angle $DAB = 8T°$.



Pass on the size in degrees of angle BCD.

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SHUTTLE

T is the number you will receive.

B2

Lewis has a bag containing $(T + 1)$ counters, 8 of which are red. He takes out two counters, one after the other, without replacement.

The probability that both of Lewis's counters are red is $\frac{p}{q}$, a fraction in its lowest terms.

Pass on the value of $q - 3p$.

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SHUTTLE

T is the number you will receive.

B4

An arithmetic sequence starts 136, 128, 120, 112...

Write down the value of the $(10T)^{\text{th}}$ term.

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C1

$$2\tfrac{3}{4} \times 4\tfrac{5}{6} \div 6\tfrac{7}{8} = \frac{a}{b}$$

$\frac{a}{b}$ is a fraction in its lowest terms.

Pass on the value of $2b - a$.

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SHUTTLE

C3

T is the number you will receive.

Evan has two shades of purple paint:

- Paint A contains red and blue paint in the ratio 1 : 3.
- Paint B contains red and blue in the ratio 2 : 3.

He makes a new shade, *Evanescence*, by mixing paints A and B together in the ratio $1 : (T - 1)$.

The ratio of red to blue paint in *Evanescence* is $a : b$, written in its lowest terms.

Pass on the value of $b - a$.

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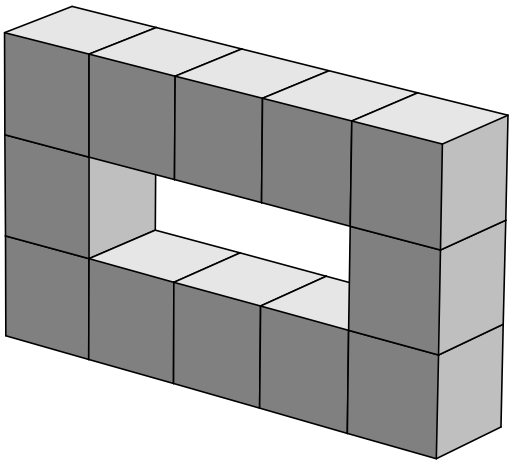
SHUTTLE

T is the number you will receive.

C2

The shape below consists of 12 cubes of side $\frac{1}{2}T$ cm.



The total surface area is $A\,\text{cm}^2$.

Pass on the value of $\frac{A}{2}$.

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SHUTTLE

T is the number you will receive.

C4

Tia's age is T times her age in T years' time minus T times her age T years ago.

Write down Tia's age.

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SHUTTLE

D1

The prime factorisation of 999000 can be written as $2^a \times 3^b \times 5^c \times d$,

where a, b and c are whole numbers, and d is a prime number.

Pass on the value of $d - abc$.

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SHUTTLE

D3

T is the number you will receive.

Jennifer has built some pyramids with T-sided polygons as their base, and some prisms with T-sided polygons as their base.

In total there are 70 edges and 44 vertices on the 3D-shapes.

Pass on the total number of 3D-shapes Jennifer has built.

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SHUTTLE

T is the number you will receive.

D2

Evie travels a distance of T km at an average speed of x km per hour. She then travels a further $\frac{3T}{2}$ km at an average speed of $\frac{x}{2}$ km per hour.

The whole journey takes 8 hours.

Pass on the value of x.

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SHUTTLE

T is the number you will receive.

D4

A blue panther runs 20% more slowly than a black panther, but $4T$% more quickly than a pink panther.

A black panther runs B% more quickly than a pink panther.

Write down the value of B.

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SHUTTLE RESPONSE SHEET

TEAM MATHS CHALLENGE 2016 NATIONAL FINAL

TEAM NUMBER

SCHOOL NAME

A1 0 1 3	**B1** 0 1 3	**C1** 0 1 3	**D1** 0 1 3
A2 0 1 3	**B2** 0 1 3	**C2** 0 1 3	**D2** 0 1 3
A3 0 1 3	**B3** 0 1 3	**C3** 0 1 3	**D3** 0 1 3
A4 0 1 3	**B4** 0 1 3	**C4** 0 1 3	**D4** 0 1 3
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

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