A1 A sequence starts with the number 247.

Each successive number in the sequence is found by doubling the previous number and adding five.

Pass on the value of the fourth number in the sequence.

A3 *T is the number that you will receive.*

Pass on the value of:

$$\frac{3T^2}{4} \div \frac{9T}{2}$$

A2 *T is the number that you will receive.*

Pass on the value of:

$$5T - 14 - 3T - 22 + T + 3$$

A4 *T is the number that you will receive.*

During a heavy storm in Mathstown last year, a lot of rain fell:

- The rain fell for 2 hours.
- In each square metre of Mathstown, T raindrops fell per minute.
- Each raindrop weighed 1 gram.
- Mathstown has a total area of 2 million square metres.

How many tonnes of water fell on Mathstown in this storm?
(1 tonne = 1000 kg)

B1 In the Mathstown greengrocer's shop:

- 9 apples cost the same as 6 bananas, and
- 4 bananas cost the same as 3 coconuts.

At these same prices, A apples cost the same as 8 coconuts.

Pass on the value of A.

B3 *T is the number that you will receive.*

A regular T-sided polygon has all of its interior diagonals drawn in.

The polygon has D **different** lengths of interior diagonal.

Pass on the value of D.

B2 *T is the number that you will receive.*

Five numbers (in no particular order) are:

$$10,\ 4,\ 20,\ 15,\ T$$

Their mean is a and their median is b.

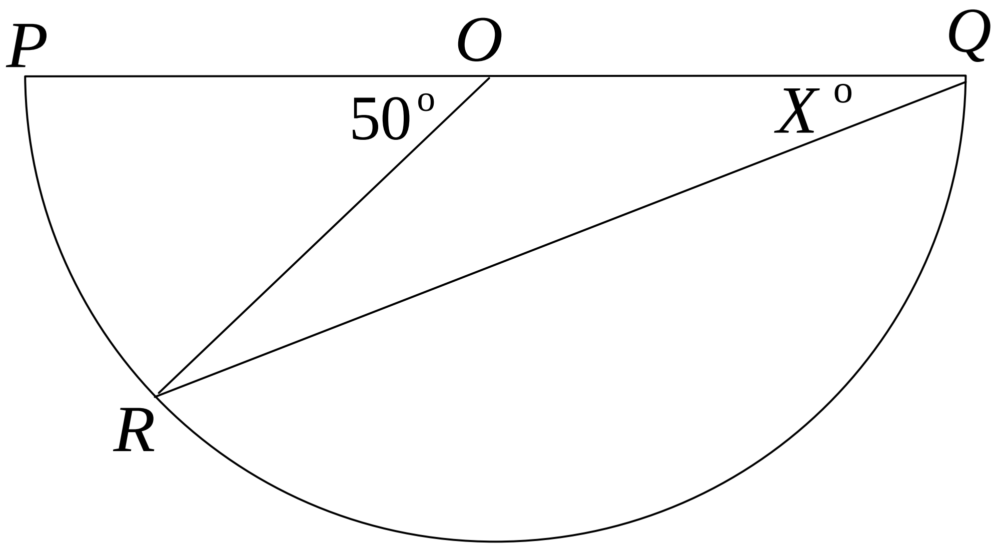
Pass on the value of $2a - b$.

B4 *T is the number that you will receive.*

Sophie cycles the first 150 metres of her race in $8T$ seconds, then cycles the remaining 250 metres in $12T$ seconds.

Calculate her average speed for the whole 400 metre race, in metres per second.

C1 POQ is the diameter of a semicircle with centre O. R is another point on the semicircle.



Pass on the value of X.

C3 *T is the number that you will receive.*

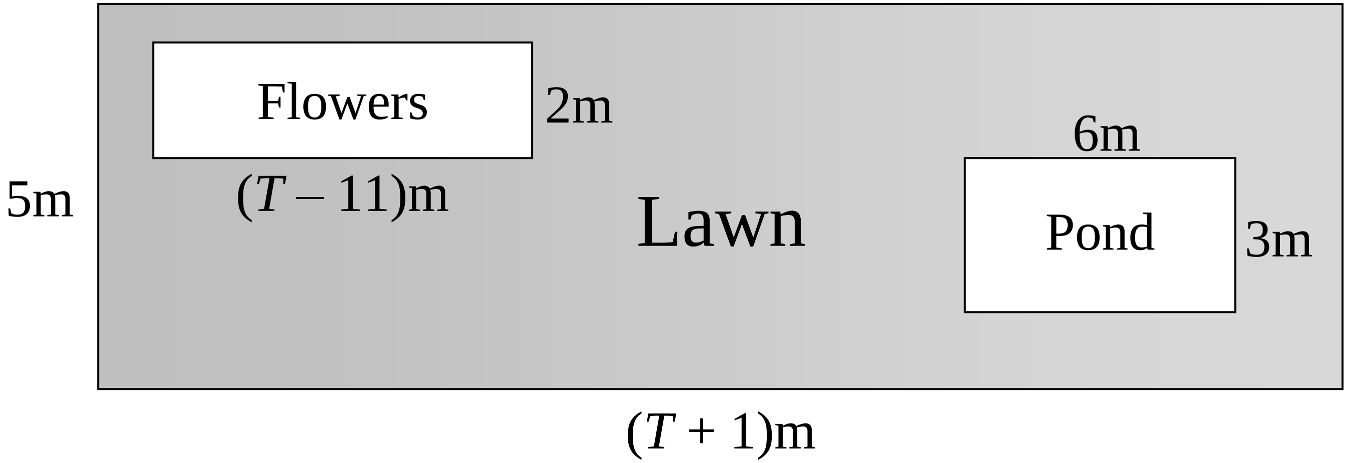
Terrible Timmy tears his test paper into T pieces.

He takes half of this number of pieces and rips each one into 2. He then picks up one of the remaining pieces of paper and tears it into T pieces.

He now has P pieces of paper. Pass on the value of P.

C2 *T is the number that you will receive.*

This is a plan of my rectangular garden:



The area of lawn (shaded) is A m^2. Pass on the value of $\dfrac{A}{7}$.

C4 *T is the number that you will receive.*

When 12^T is written as a product of prime factors, it becomes $2^a \times 3^b$.

Calculate the value of $a + b$.

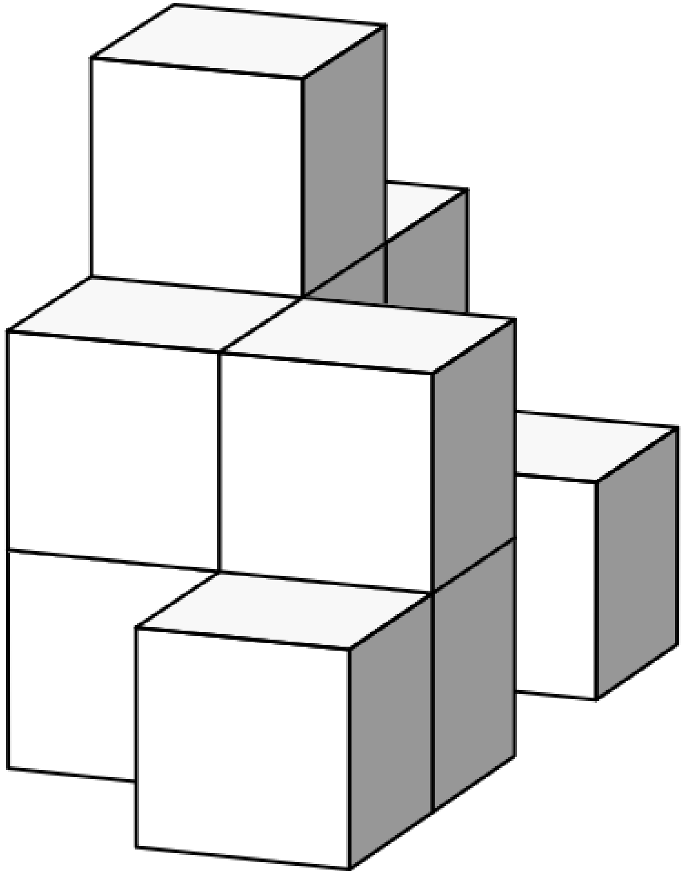
D1 During a “January Madness” sale, Mathstown sports shop had 40% off all prices, and then a further 25% off sale prices.

The total saving off the original price was P%.

Pass on the value of $\dfrac{P}{5}$.

D3 *T is the number that you will receive.*

The diagram shows a sculpture made from a number of Tcm × Tcm × Tcm cubes, built on top of each other, without being stuck together.



The minimum volume that the sculpture could be is V cm^3. Pass on the value of V.

D2 *T is the number that you will receive.*

Pass on the value of:

$$\sqrt{\sqrt{3^2+4^2+(3\times 4)^2}+2-T}$$

D4 *T is the number that you will receive.*

The expression

$$\boxed{1\tfrac{1}{2} \times 1\tfrac{1}{3} \times 1\tfrac{1}{4} \times 1\tfrac{1}{5} \times 1\tfrac{1}{6} \times 1\tfrac{1}{7} \times 1\tfrac{1}{8} \times \ \ldots \ \times 1\tfrac{1}{T}}$$

can be simplified to $\frac{N}{2}$, where N is a whole number.

Find the value of N.