

**A1** Write down the value of

$$(4^2 + 5^2) \times 7^2$$



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

At which number will the minute hand of a clock be pointing  $T + 1$  minutes after midnight?



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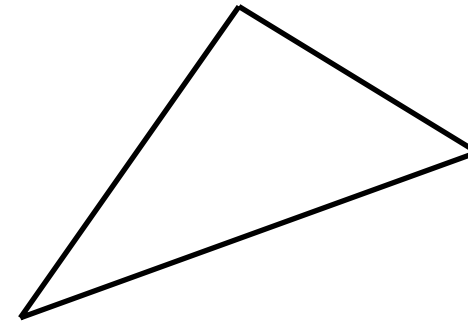


WINTON

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

John has three sticks that he has formed into a triangle. The length of each stick is a whole number of centimetres.

One of the sticks is  $(T + 1)$  cm long and another is  $(T - 1)$  cm long.



How many different lengths could John's third stick be?



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WINTON

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

A polygon-based pyramid has  $T$  faces.

How many edges does the pyramid have?



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**B1** Write down the value of

$$\frac{2^6 + 3^5 - 4^4 + 5^3 - 6^2}{7^1 \times 8^0}$$



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

Write down the answer to the following:

$$\left( \frac{5}{2} \times \frac{13}{5} \times \frac{T}{3} \times \frac{1}{5} \times \frac{7}{2} \times \frac{5}{14} \right) - \left( \frac{6}{5} \times \frac{15}{8} \times \frac{T}{3} \times \frac{5}{6} \times \frac{1}{3} \times \frac{1}{5} \right)$$



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

Mark can run at 12 km/h.

Holly can run  $20T$  metres in 45 seconds.

In a 3200m race what is the difference, in minutes, in their finishing times?



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

Five numbers have the following properties:

- The median of the numbers is  $T$
- The mode of the numbers is 2
- The mean of the numbers is 5
- The range of the numbers is  $2T$

Write down the product of the five numbers.



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**C1** Write down the value of

$$\frac{1 + 2 - (-3) - (4 - 5) - (6 - 7 - 8)}{16 - 15 - 14 + 13 + 12 - 11 + 10 - 9}$$



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WINTON

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

A red die and a blue die numbered from 1 to 6 are both rolled and the scores added together.

Find the number of ways of scoring more than *T*.



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

A cylinder with base radius  $T$  cm and height 12 cm is full of paint. The paint is poured into some smaller cylinders of base radius 6 cm and height  $T$  cm.

How many of these smaller cylinders can be completely filled with the paint?



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

Write down the lowest common multiple of  $12(T - 1)$  and  $9(T + 1)$ .



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**D1** Write down the value of

$$\frac{(8^2 - 6^2)(4^2 - 2^2)}{(4^2 - 3^2)(2^2 - 1^2)}$$



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

The value of  $T$  is a square number less than 50.  
Write down the number of factors of  $T$ .



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

We define the *factorial* of the number  $n$  to be

$$n! = n \times (n - 1) \times (n - 2) \times \cdots \times 3 \times 2 \times 1.$$

Write down the value of  $\frac{(T + 1)!}{20}$



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

John drives at  $T$  metres per second around a circular track. Kevin drives at  $(2T - 30)$  metres per second around the same track. They start together.

When John finishes his 15<sup>th</sup> lap, on which lap is Kevin?



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**E1** Calculate the number of sides of a polygon with internal angles summing to  $2880^\circ$ .



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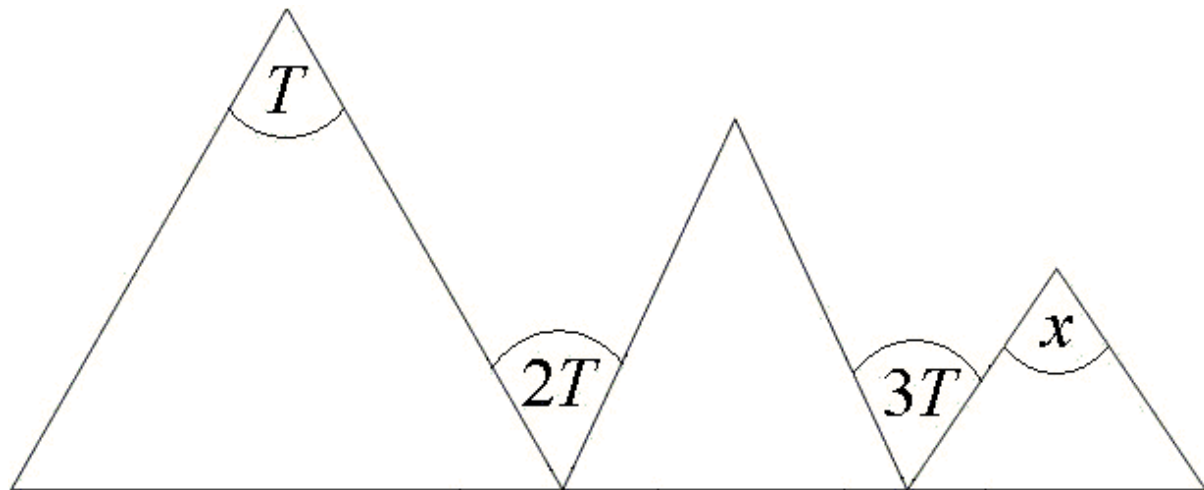
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**E2** *T is the number that you will receive.*

The diagram shows three isosceles triangles (the unequal sides form a straight line which is the base of the diagram). All angles are measured in degrees.

Find the value of  $x$ .



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**E3** *T is the number that you will receive.*

Each term in a sequence of numbers differs from the previous one by the same number. The first term is  $T$  and the 10<sup>th</sup> term is  $2T$ .

Write down the 12<sup>th</sup> term.



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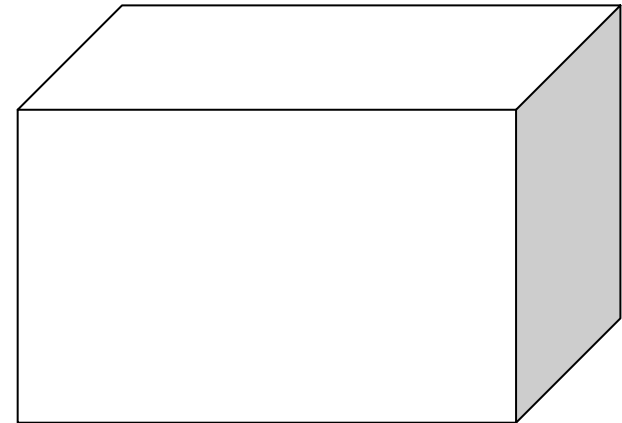
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**E4** *T is the number that you will receive.*

A cuboid with volume  $T \text{ cm}^3$  has sides with lengths  $x \text{ cm}$ ,  $(x + 1) \text{ cm}$  and  $(x + 2) \text{ cm}$ , where  $x$  is an integer.

Find the total length, in cm, of all the edges.



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**F1** The digits from 1 to 9 can be placed once each into the boxes to make the four equations (three horizontal and one vertical) all true. One digit has been filled in to help you. What digit must be placed in the middle box?

<div style="border: 1px solid black; width: 100%; height: 30px;"></div>	÷	<div style="border: 1px solid black; width: 100%; height: 30px;"></div>	=	<div style="border: 1px solid black; width: 100%; height: 30px; display: flex; align-items: center; justify-content: center;"><span style="font-size: 2em;">3</span></div>
				+
<div style="border: 1px solid black; width: 100%; height: 30px;"></div>	−	<div style="border: 3px double black; width: 100%; height: 30px;"></div>	=	<div style="border: 1px solid black; width: 100%; height: 30px;"></div>
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<div style="border: 1px solid black; width: 100%; height: 30px;"></div>	+	<div style="border: 1px solid black; width: 100%; height: 30px;"></div>	=	<div style="border: 1px solid black; width: 100%; height: 30px;"></div>



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**F2** *T is the number that you will receive.*

Write down the value of

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



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**F3** *T is the number that you will receive.*

Write down the value of  $x$  in this pair of simultaneous equations:

$$x + y = T$$

$$5x - 3y = 7$$



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**F4** *T is the number that you will receive.*

Calculate the difference between the sum of the first  $T$  square numbers and the sum of the first  $T$  triangular numbers.



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