A1 Evaluate the following:

$$\left(\frac{8}{27}\right)^{\frac{1}{3}} \times \left(\frac{49}{100}\right)^{0} \times \left(\frac{4}{9}\right)^{-\frac{3}{2}}$$

Write your answer in the form $\frac{a}{b}$ in its simplest form.

Pass on the value of $a - b$.

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

C is the midpoint of the line AB.
C is the point $(T - 2, -2)$, and
B is the point $(T - 1, T + 1)$.

A is the point (a, b).

Pass on the value of $a - b$.

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

The quadratic equation $2y^2 + (1 - T)y - 6 = 0$ has one positive solution a and one negative solution b.

Pass on the value of $a + 4b$.

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

Rearrange the following equation to make x the subject.

$$y = \frac{(T-1)x + 2}{x - T}$$

Give your answer in the form $x = \dfrac{ay+b}{cy+d}$ where $a > 0$.

B1 A set of five positive integers has:

a mean of 9,
a median of 9, and
a mode of 11.

Pass on the smallest integer in the set.

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

Solve the simultaneous equations

$$\begin{aligned} a + b + c &= 6 \\ 3a + 2b + c &= T + 4 \\ 9a + 4b + c &= 3T + 2 \end{aligned}$$

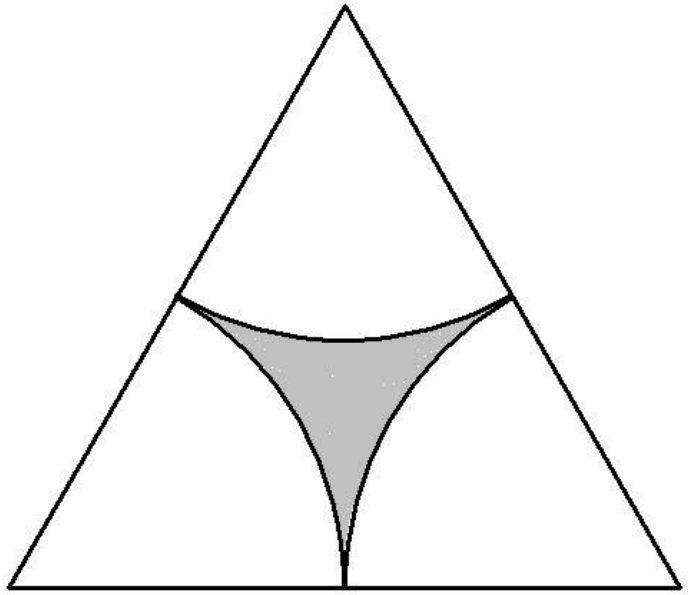
Pass on the value of $a + c$.

(Hint: start by subtracting the first equation from each of the other two.)

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

Three arcs of radius $\frac{T}{2}$ cm are drawn centred at the vertices of an equilateral triangle of side T cm as shown in the diagram.

The area of the shaded region is $a\sqrt{3} - b\pi$ cm^2.



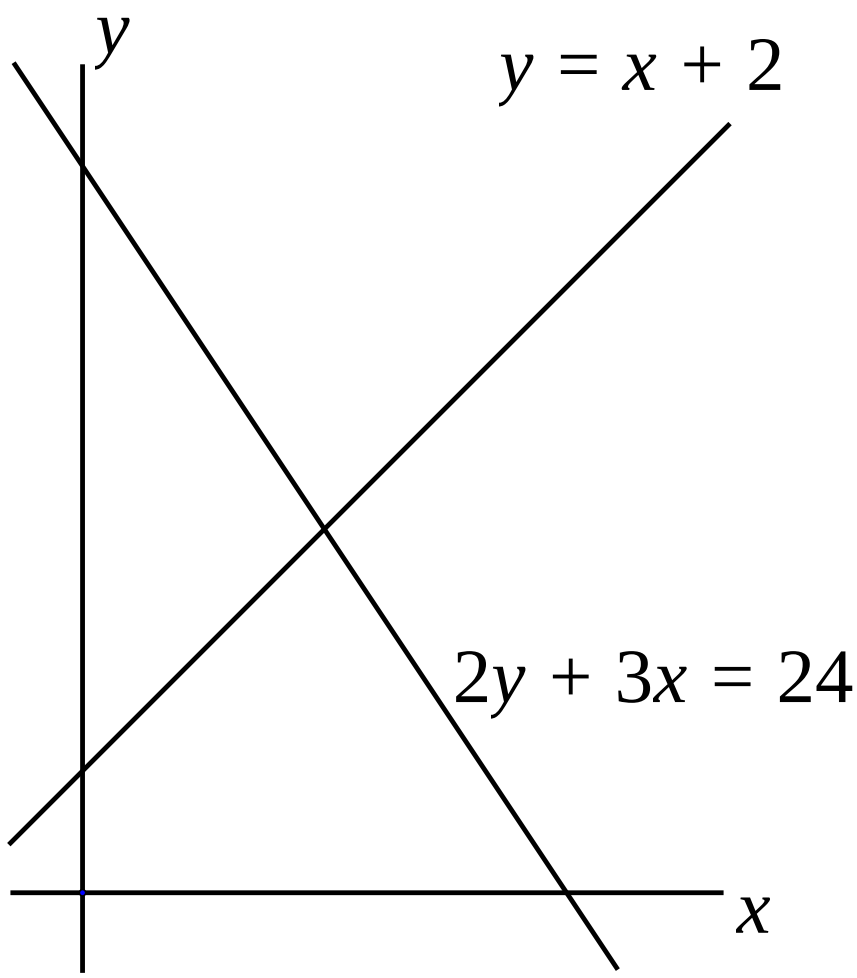
Pass on the value of $a + b$.

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

The value of $\dfrac{T\sqrt{12}}{\sqrt{3}-\sqrt{2}}$ can be expressed in the form $a+b\sqrt{6}$, where a and b are integers.

Write down the value of $a-b$.

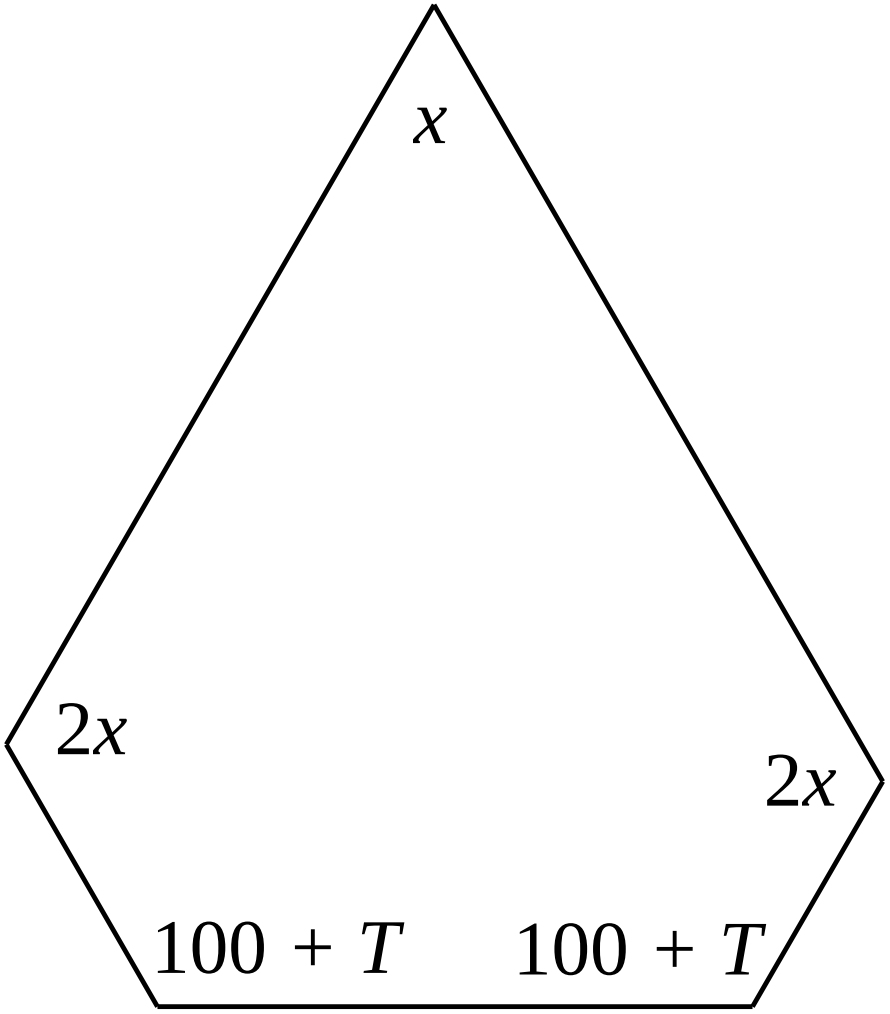
C1 A triangle is enclosed by the y axis, the line $y = x + 2$, and the line $2y + 3x = 24$, as shown in the diagram.



Pass on the area of the triangle.

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

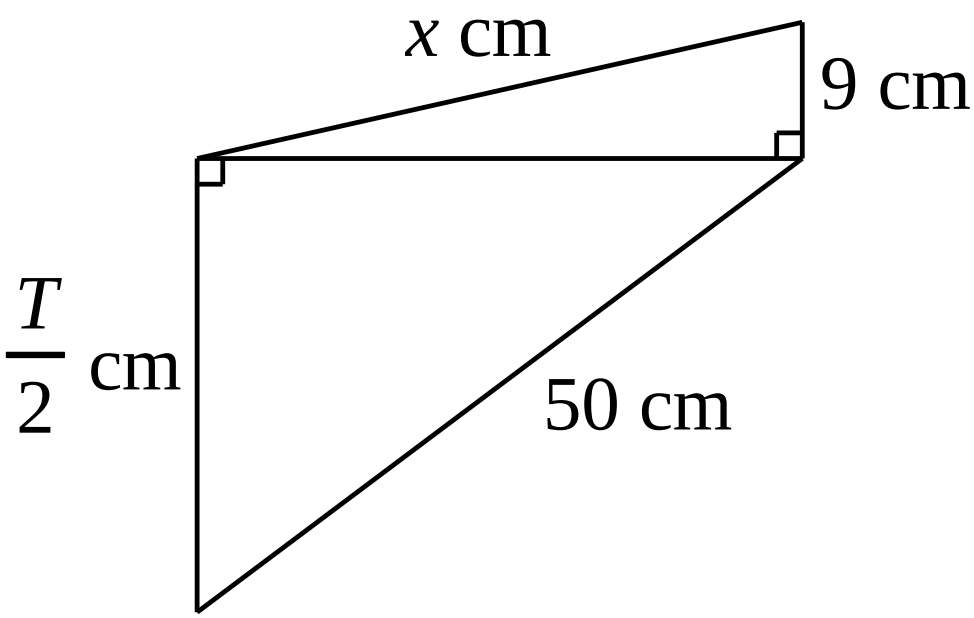
An irregular pentagon has angles $(100 + T)°$, $(100 + T)°$, $(2x)°$, $(2x)°$ and $x°$ as shown in the diagram.



Pass on the value of x.

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

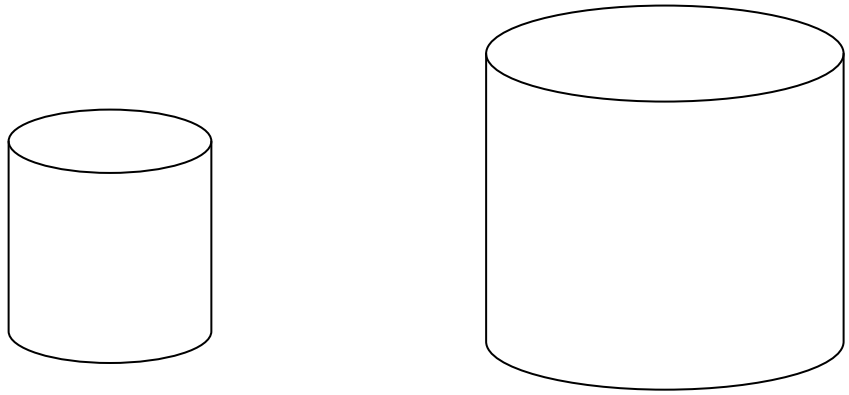
The diagram shows two right-angled triangles joined along a common side.



Pass on the value of x.

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

A sample pot of paint is similar to a regular pot as shown in the diagram. The area of the lid of the sample pot is 54 cm^2 and the area of the lid of the regular pot is 384 cm^2. The volume of paint in the sample pot is $(6T + 24)$ ml.



Sample Pot

Regular Pot

Calculate the volume, in litres, of paint in the regular pot.

D1

Let

$$\left(\frac{1}{2}\right)^{y+4} \div \left(\frac{1}{8}\right)^{2y+1} = 512.$$

Pass on the value of y.

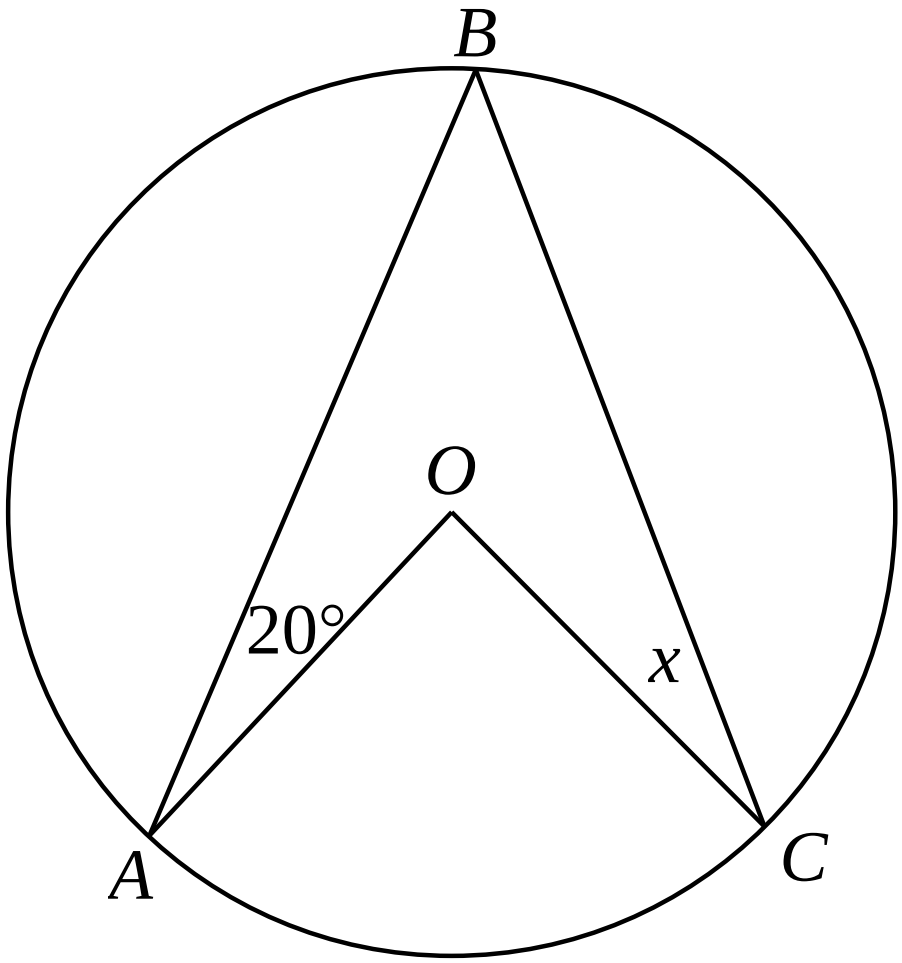
D2 *T is the number that you will receive.*

Paula is going jogging. She jogs 20 km at x km/h and then a further 20 km at $(x + T)$ km/h. Her second 20 km took her 30 minutes less than the first.

Pass on the value of x.

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

In a circle centre O, angle ABC is $(5T + 4)°$, angle BAO is $20°$, and angle BCO is $x°$, as shown in the diagram.



Write down the value of $\frac{1}{6}x$.

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

Let

$$x = \sqrt{3+\sqrt{T+1}} - \sqrt{3-\sqrt{T+1}}$$

Write down the value of x^2.