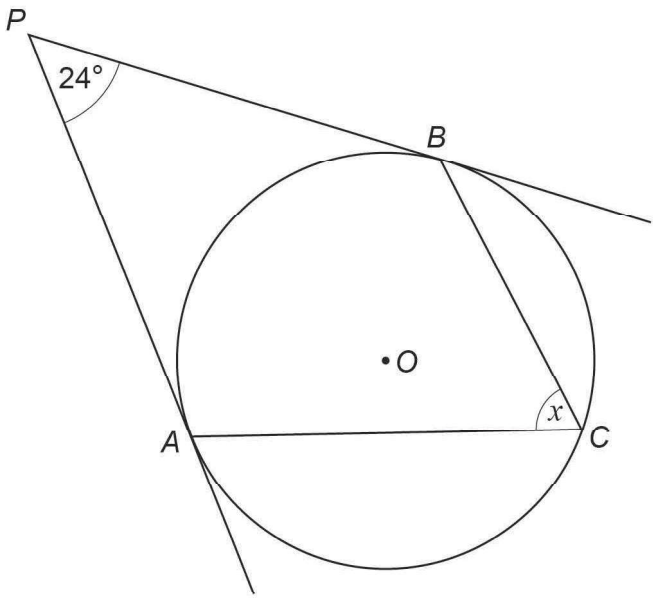
Do not write outside the box

22 *A*, *B* and *C* are points on a circle, centre *O*.

AP and *BP* are tangents to the circle.

Not drawn accurately



Work out the size of angle x.

[3 marks]

Answer _____ °

6

Do not write outside the box

23 (a) The first three terms of a geometric progression are $\frac{\sqrt{5}}{2}$ $\frac{5}{4}$ $\frac{5\sqrt{5}}{8}$

Work out the next term.

[1 mark]

Answer _____

23 (b) The nth term of a sequence is $(2+\sqrt{3})^n$

Show that the third term is $26+15\sqrt{3}$

[3 marks]

Do not write outside the box

24 (a) $9k + 7$ and $2k^2 + 3$ are consecutive integers.

$9k + 7$ is the smaller integer.

Work out the value of the **next** consecutive integer.

[5 marks]

Answer _____

24 (b) x is a square number.

Show that the **next** square number is $x + 2\sqrt{x} + 1$

[2 marks]

11

Do not write outside the box

25 Show that the value of $6 \sin 30° + 2 \cos 30° \times 4 \tan 30°$ is an integer.

[4 marks]

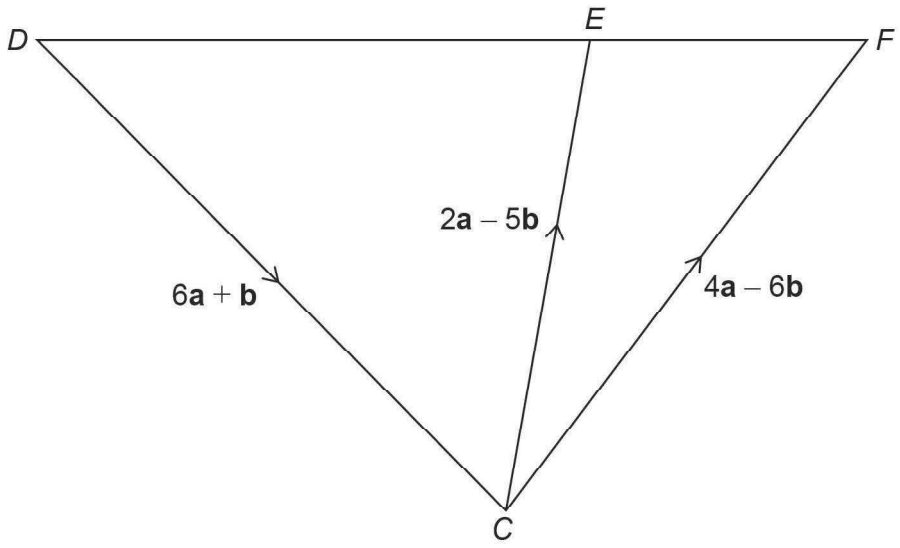
END OF QUESTIONS

4

Do not write outside the box

23

Not drawn accurately



Prove that *DEF* is a straight line.

[4 marks]

7

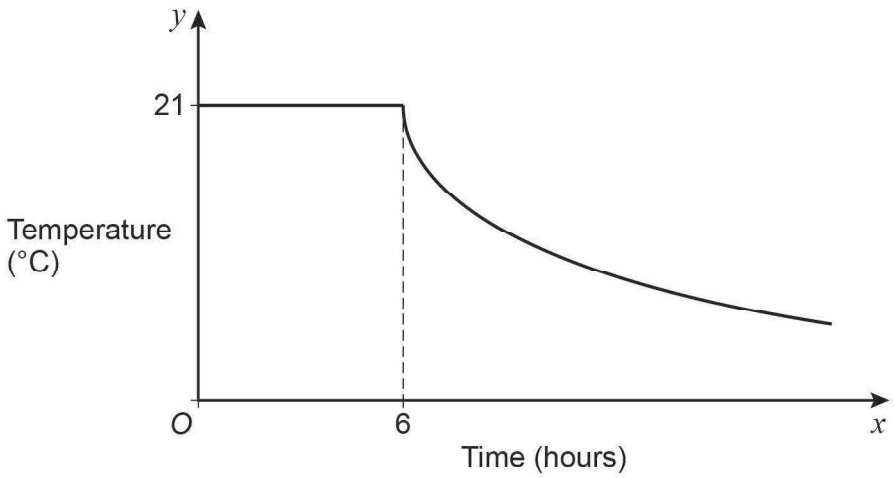
Turn over ►

Do not write outside the box

24 A room is kept at a constant temperature of 21° C for 6 hours.

The heating is then turned off and the room begins to cool.

Here is a sketch graph showing the temperature, y°C, of the room at time x hours.



24 (a) Assume the equation of the curved part is $y = \frac{k}{x}$ where k is a constant.

Work out the value of y when $x = 12$

[2 marks]

$y =$ _____

Do not write outside the box

24 (b) In fact,

the equation of the curved part is $y = A \times \left(\frac{1}{3}\right)^{\frac{1}{6}x}$ where A is a **different** constant.

How does this affect the value of y when $x = 12$?

Tick **one** box.

You **must** show working to support your answer.

[2 marks]

☐ The value of y is greater than the answer to part (a).

☐ The value of y is less than the answer to part (a).

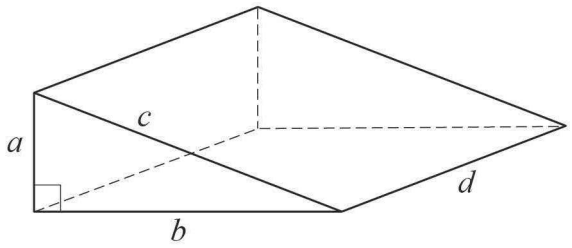
☐ The value of y is the same as the answer to part (a).

Turn over for the next question

4

Do not write outside the box

25 Here is a right-angled triangular prism.



The ratio of the edges is $a : b : c : d = 3 : 4 : 5 : 12$

The **volume** of the prism is $1125\,\text{cm}^3$

Work out the total length of **all** of the edges of the prism.

[5 marks]

Answer _____ cm

END OF QUESTIONS

5

Do not write outside the box

20 P, Q, and R have positive values.

P is directly proportional to Q

When $P = 8$, $Q = 2$

R is inversely proportional to Q^2

When $R = 10$, $Q = 3$

Work out the value of R when $P = 0.5$

[5 marks]

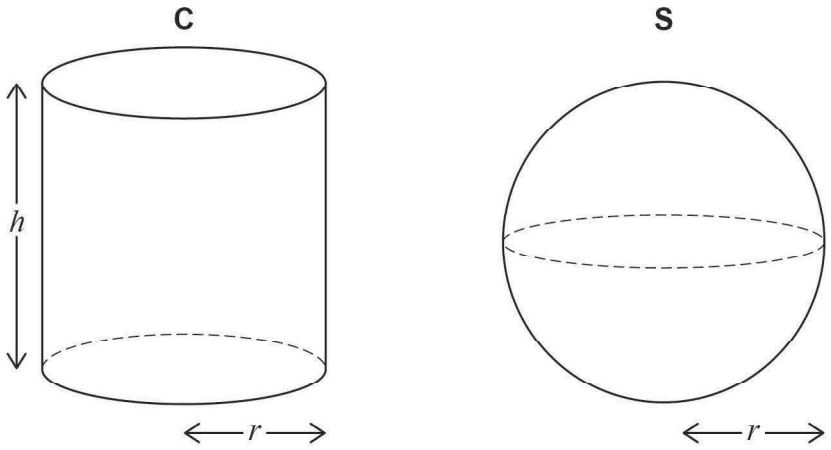
$R =$ _____

Turn over for the next question

11

21 A cylinder, C, and a sphere, S, each have radius r

C has height h



Volume of a sphere $= \frac{4}{3}\pi r^3$

where r is the radius

21 (a) volume of C = volume of S

Work out the ratio $r : h$

You **must** show your working.

[3 marks]

Answer _____ : _____

Do not write outside the box

21 (b) A **different cylinder** has radius $3r$ and height $2h$.

How many times bigger is the volume of this cylinder than the volume of C?

[2 marks]

Answer _____

22 Fatima is choosing a 4-digit code.

Each digit is a whole number from 0 to 9

She decides

all her digits will be odd numbers

no digits will be repeated.

How many different codes can she make?

[2 marks]

Answer _____

7

Do not write outside the box

23 Quadrilateral *ABCD* is reflected in edge *BC*.

How many of the vertices are invariant?

Circle your answer.

[1 mark]

1 2 0 4

24 Write $2x^2 - 12x + 7$ in the form $d(x + e)^2 + f$

where d, e and f are integers.

[3 marks]

Answer _____

END OF QUESTIONS

4