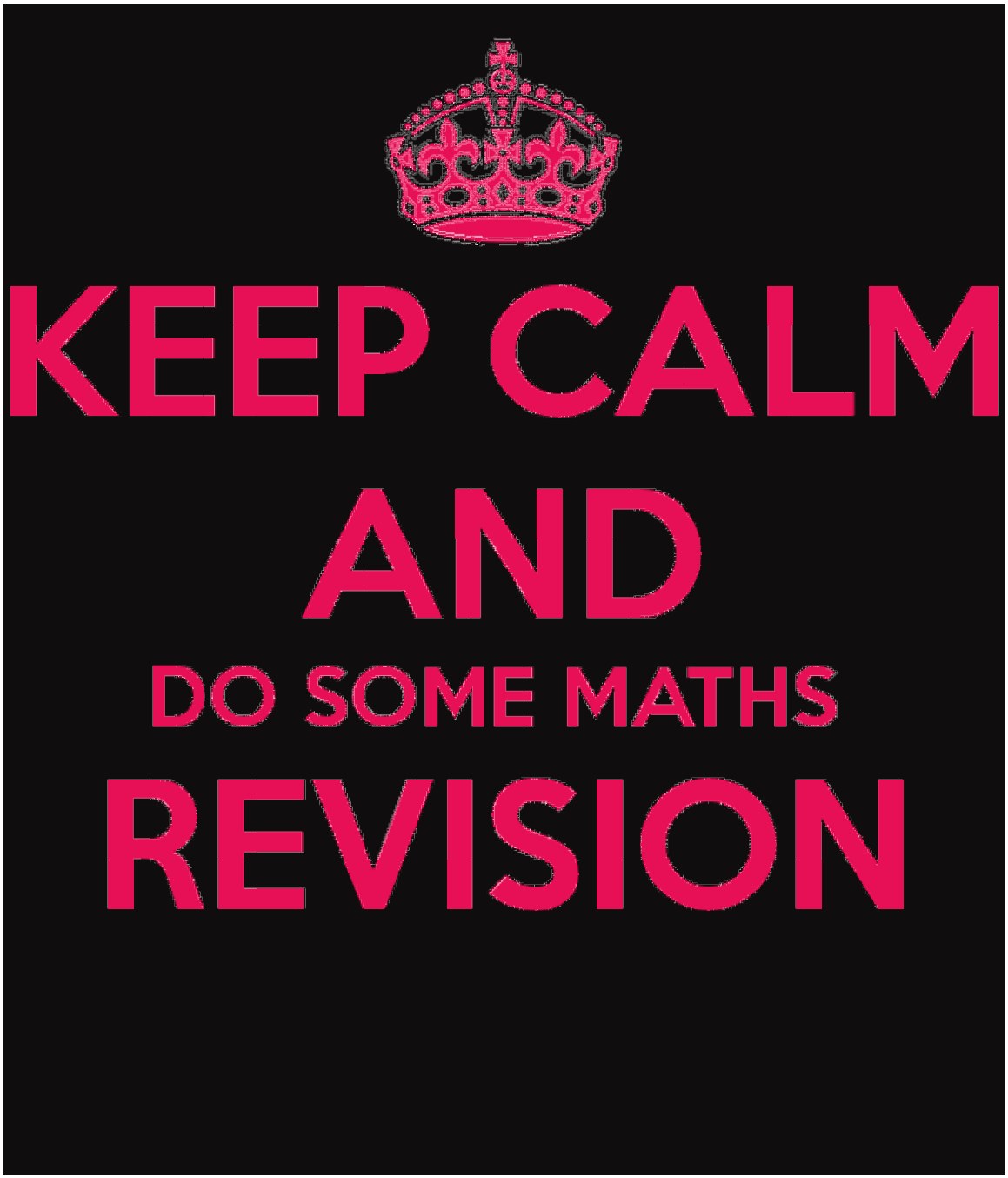
Grade Grabber
R E V I S I O N 2023



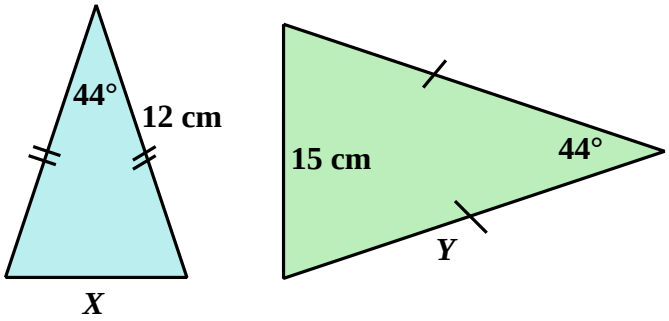
IGCSE Mathematics

Grade Grabber 7

40 Mark Paper

Question 1

Two isosceles triangles are sketched below;



(i) Explain why the two triangles are similar.

[1 mark]

(ii) The sine rule tells us that for any triangle with vertices A, B and C

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Use the sine rule to calculate the integer length of the side marked X.

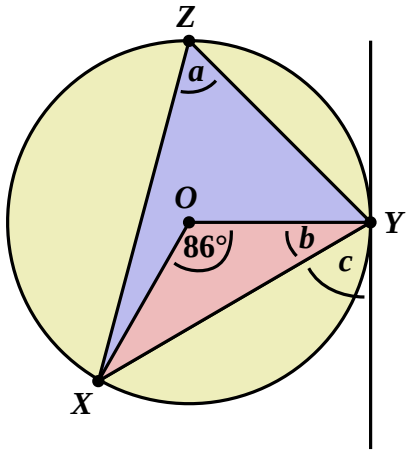
[2 marks]

(iii) Use the fact that the triangles are similar to calculate the side marked Y.

[2 marks]

Question 2

In the diagram below, *O* is the centre of a circle.
X, *Y* and *Z* are three points on the circumference of the circle.
The line touching at *Y* is a tangent.



Write down the size of the angles;

(i) *a* **(ii)** *b* **(iii)** *c*

[2, 2, 2 marks]

Question 3

The formula, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, can be used to find solutions to a quadratic equation written in the form $ax^2 + bx + c = 0$, where *a*, *b* and *c* are constants.

Show how this formula may be used to solve the equation, $x^2 + x = 1$
Write your solutions to an accuracy of three decimal places.

[4 marks]

Question 4

Two numbers can be described as "coprime" if they have only 1 as a common factor.
For example, 2078 and 4520 are NOT coprime because they both divide by 2.

(a) Which **one** of the following pairs of numbers are coprime ?

(i) 21, 24

(ii) 35, 50

(iii) 33, 77

(iv) 25, 27

For each pair that are not coprime state a factor they have in common.

[4 marks]

(b) 441 can be written as $3 \times 3 \times 7 \times 7$
We say 441 has been written as a product of primes.

(i) Write 550 as a product of primes.

[1 mark]

(ii) Are 441 and 550 coprime ?

[1 mark]

Question 5

Make x the subject of the formula $y = \dfrac{7 - 3x}{x + 5}$

[4 marks]

Question 6

This question is about solving the equation :

$$\frac{3}{(x+3)} + \frac{2}{(x+7)} = 1$$

(i) Show that this equation can be written in the form $x^2 + 5x - 6 = 0$

[4 marks]

(ii) Hence write down the two solutions to the original equation.

[2 marks]

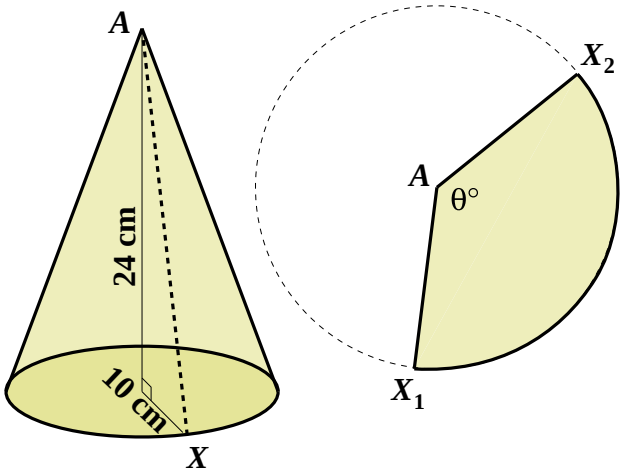
Question 7

Use algebra to show that $0.\dot{7}\dot{7}\dot{2} = \frac{17}{22}$

[2 marks]

Question 8

A wizard's hat is made out of a cone of paper.
It is 24 cm high and the base radius is 10 cm.



(i) Use the theorem of Pythagoras to calculate the slant height, AX.

[1 mark]

(ii) As a part of a magic spell the cone is to be cut along AX and the paper laid flat as the words "***Passus meus IGCSEus at grade Nineus***" are muttered. Find the length of the curved arc, $X_1 X_2$, of the sector.

[2 marks]

(iii) Find the angle, θ, of the sector.

[2 marks]

(iv) Find the area of the paper.

[2 marks]