

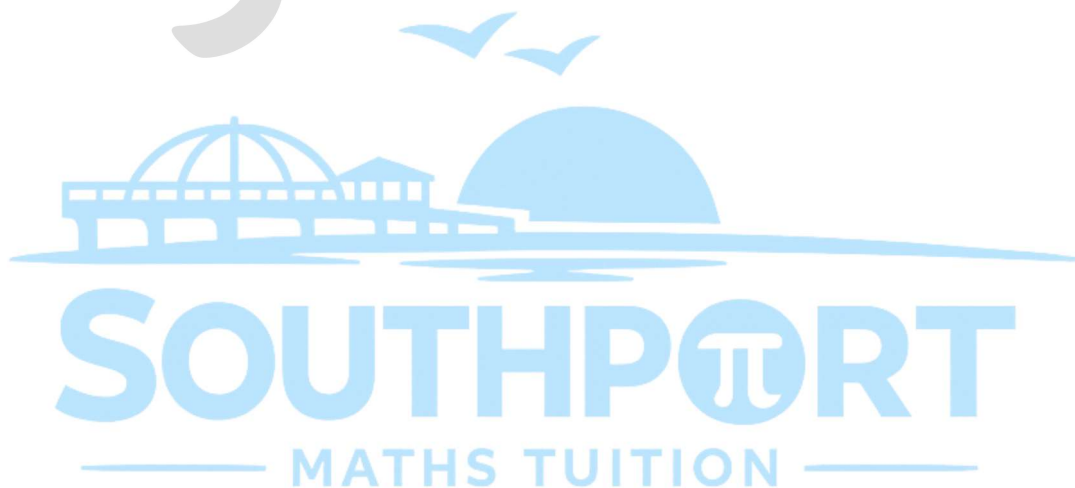
GCSE MATHEMATICS

Depth

REVISION BOOKLET

Name: _____

SAMPLE



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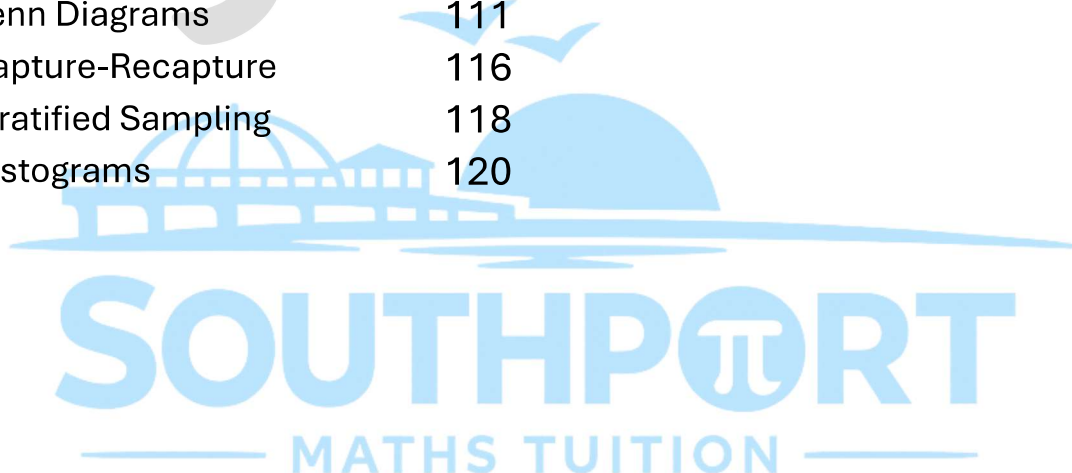
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Inverse Proportion – What you need to know:

- Two quantities are in **inverse proportion** when one increases and the other decreases so that their **product stays constant**.
- If A is inversely proportional to B , we write

$$A \propto \frac{1}{B} \quad \text{and} \quad A = \frac{k}{B}$$

where k is the constant of proportionality.

- To find the constant k , substitute a known pair of values into the equation.
- Once you know k , use the equation to find missing values.
- Sometimes you are told a relationship like “ x is inversely proportional to y^2 ”

$$x \propto \frac{1}{y^2} \quad \text{and} \quad x = \frac{k}{y^2}$$

- The method is the same: **substitute** → **find k** → **use the equation**.

1. A is inversely proportional to B .

When $B = 4$, $A = 15$.

Find the value of A when $B = 10$.

2 marks

2. y is inversely proportional to x .

When $x = 6$, $y = 12$.

Find the value of y when $x = 9$.

2 marks

3. P is inversely proportional to Q .

When $Q = 5$, $P = 18$.

Write an equation connecting P and Q , and use it to find P when $Q = 12$.

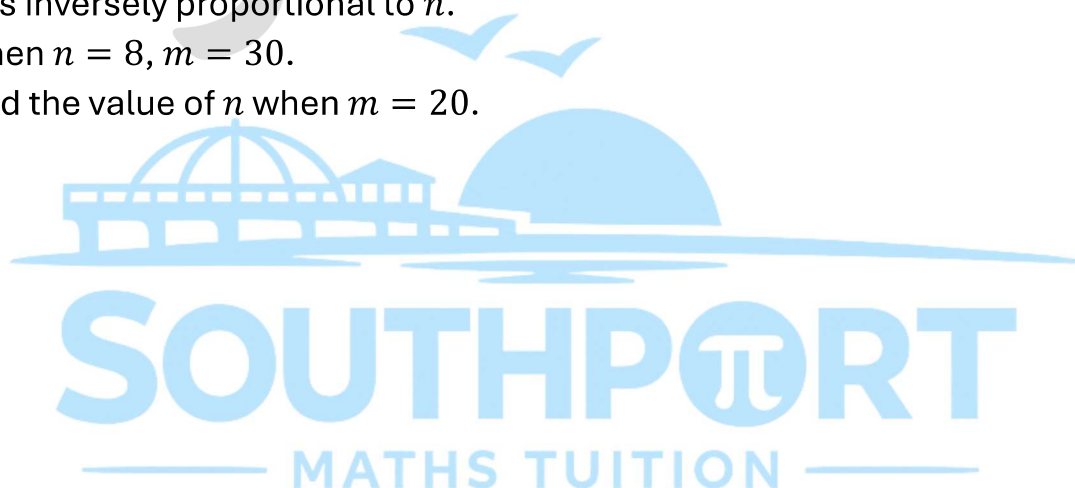
3 marks

4. m is inversely proportional to n .

When $n = 8$, $m = 30$.

Find the value of n when $m = 20$.

3 marks



Completing the square – What you need to know:

- Completing the square rewrites a quadratic into the form $(x + p)^2 + q$
- The completed-square form shows the **minimum value** and **turning point** directly.
- The turning point of $(x + p)^2 + q$ is $(-p, q)$.

These rules apply when the coefficient of x^2 is 1

- For $x^2 + bx + c$ the value of p is always **half** the value of b
- After forming $(x+p)^2$, adjust the constant to get the correct value of q .

1. Rewrite $x^2 + 6x$ in the form $(x + p)^2 + q$.

2 marks

2. Complete the square for $x^2 - 8x + 3$.
Give your answer in the form $(x + p)^2 + q$.

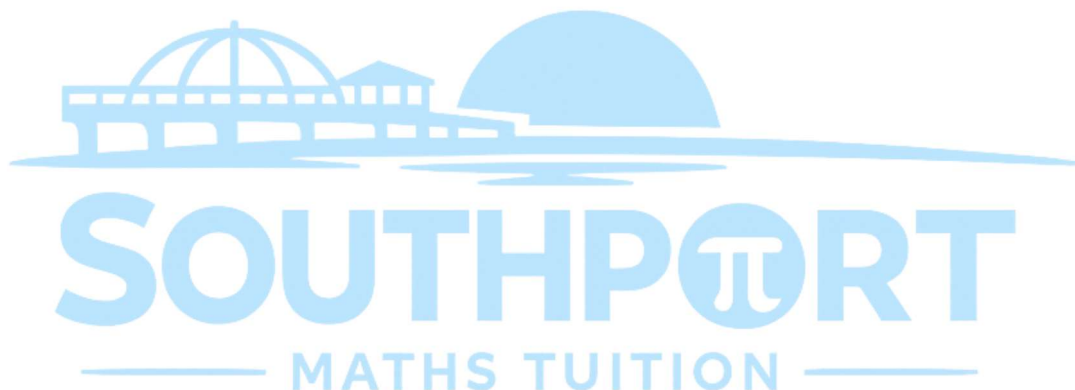
2 marks

3. Rewrite $x^2 + 10x + 4$ in completed-square form and state the **minimum value** of the expression.

2 marks

4. The quadratic $f(x) = x^2 - 4x + 7$ can be written in the form $(x + p)^2 + q$
Find the values of p and q .
Hence write down the coordinates of the turning point.

3 marks



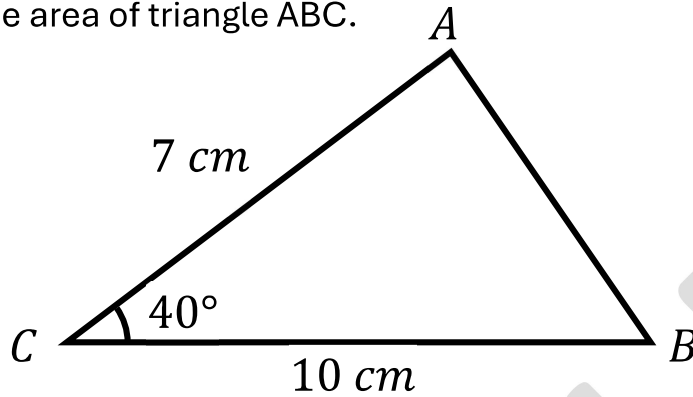
Area of a triangle – What you need to know:

- The formula works for **any triangle**, not just right-angled ones.

$$\text{Area} = \frac{1}{2}ab\sin C$$

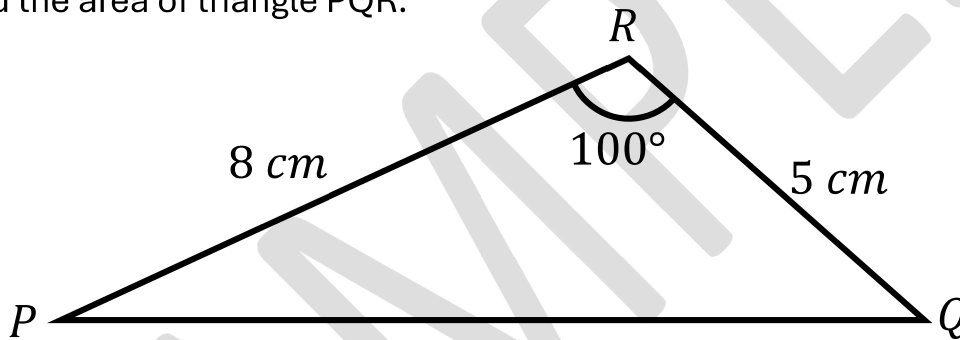
- The angle must be the one **between** the two given sides (the **included angle**).

1. Find the area of triangle ABC.



3 marks

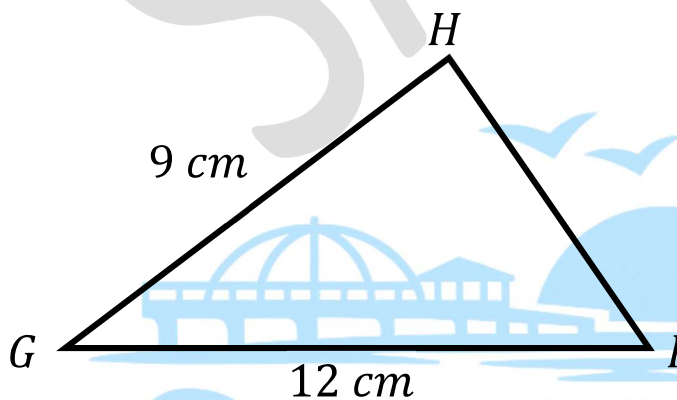
2. Find the area of triangle PQR.



3 marks

3. The area of triangle GHI is 40 cm².

Find the size of angle HGI to the nearest degree.



4 marks

Stratified Sampling – what you need to know

- Used when a population contains distinct groups (strata).
- Ensures the sample represents the population in the same proportions as the groups.
- To find how many people to sample from each group, use proportional reasoning:

$$\text{sample from group} = \frac{\text{group size}}{\text{population size}} \times \text{total sample size}$$

- Answers should be whole numbers (round sensibly if needed).
- Common strata: year groups, genders, age bands, departments, categories.

1. A school has 600 pupils.

- 240 are in Year 7
- 180 are in Year 8
- 180 are in Year 9

A stratified sample of 60 pupils is needed.

Work out how many pupils should be chosen from each year group.

3 marks

2. A company has 120 employees:

- 50 in Sales
- 30 in HR
- 40 in Production

A stratified sample of 24 employees is required.

Calculate the number of employees selected from each department.

3 marks

3. A gym has 375 members:

- 150 attend mornings
- 105 attend afternoons
- 120 attend evenings

A stratified sample of 50 members is taken.

Work out the number selected from each time group.

Give whole-number answers.

3 marks