

# MATHS GCSE REVISION ADVICE



# GCSE Overview

- Exam Board – Edexcel
- Tiers;  
Foundation (Grades 1 – 5)  
Higher (Grades 4–9)
- 3 x Papers;  
Paper 1 (Non-calculator)  
Paper 2 (Calculator)  
Paper 3 (Calculator)

Each paper is worth 80 marks, a total of 240 marks.

## Upcoming GCSE Exams

**GCSE Paper 1: Thursday 16  
May 2024 (AM)**

**GCSE Paper 2: Monday 03  
June 2024 (AM)**

**GCSE Paper 3: Monday 10  
June 2024 (AM)**



# Revise with your exam toolkit!



**Black Pen**



**Pencil**



**Rubber**



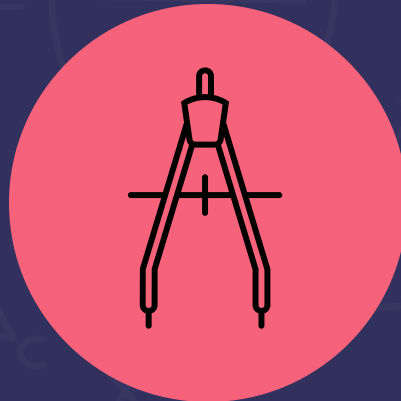
**Scientific Calculator**



**Ruler**



**Protractor**



**Compass**



**Pencil Sharpener**



# FORMULAE



## Foundation Tier Formulae Sheet

### Perimeter, area and volume

Where  $a$  and  $b$  are the lengths of the parallel sides and  $h$  is their perpendicular separation:

$$\text{Area of a trapezium} = \frac{1}{2} (a + b) h$$

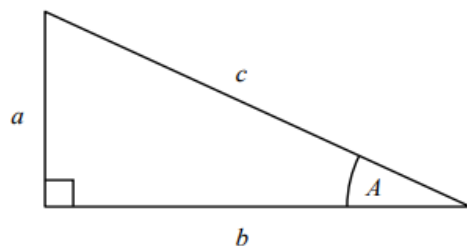
Volume of a prism = area of cross section  $\times$  length

Where  $r$  is the radius and  $d$  is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

### Pythagoras' Theorem and Trigonometry



In any right-angled triangle where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle  $ABC$  where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

### Compound Interest

Where  $P$  is the principal amount,  $r$  is the interest rate over a given period and  $n$  is number of times that the interest is compounded:

$$\text{Total accrued} = P \left( 1 + \frac{r}{100} \right)^n$$

### Probability

Where  $P(A)$  is the probability of outcome  $A$  and  $P(B)$  is the probability of outcome  $B$ :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

## Higher Tier Formulae Sheet

### Perimeter, area and volume

Where  $a$  and  $b$  are the lengths of the parallel sides and  $h$  is their perpendicular separation:

$$\text{Area of a trapezium} = \frac{1}{2} (a + b) h$$

Volume of a prism = area of cross section  $\times$  length

Where  $r$  is the radius and  $d$  is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

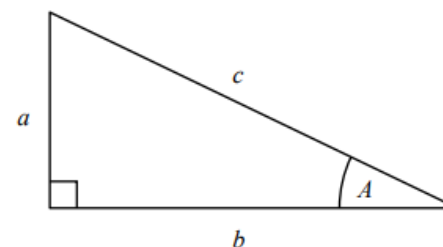
### Quadratic formula

The solution of  $ax^2 + bx + c = 0$

where  $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

### Pythagoras' Theorem and Trigonometry

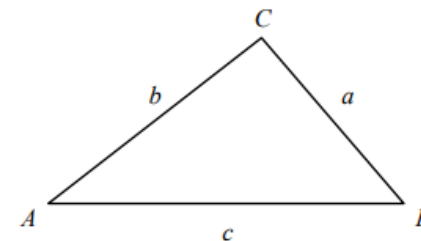


In any right-angled triangle where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle  $ABC$  where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$



In any triangle  $ABC$  where  $a$ ,  $b$  and  $c$  are the length of the sides:

$$\text{sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area of triangle} = \frac{1}{2} a b \sin C$$

### Compound Interest

Where  $P$  is the principal amount,  $r$  is the interest rate over a given period and  $n$  is number of times that the interest is compounded:

$$\text{Total accrued} = P \left( 1 + \frac{r}{100} \right)^n$$

### Probability

Where  $P(A)$  is the probability of outcome  $A$  and  $P(B)$  is the probability of outcome  $B$ :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A \text{ given } B) P(B)$$



# FORMULAE



<https://www.mathsduck.co.uk/formulae/>

## Formulae for GCSE – Foundation tier

Percentages	
Compound interest / Growth and Decay	$\left(1 \pm \frac{\%}{100}\right)^n \times \text{original}$
Original amount (reverse percentage)	$\frac{\text{new amount}}{\left(1 \pm \frac{\%}{100}\right)}$
Percentage change (percentage increase or decrease)	$\frac{\text{difference}}{\text{original}} \times 100$
Percentage score	$\frac{\text{score}}{\text{total available}} \times 100$

Angles in Polygons	
Sum of interior angles of a polygon	$180(n-2)$
Relationship between interior and exterior angles of a polygon	$\text{interior} + \text{exterior} = 180^\circ$
Exterior angle of a polygon	$\frac{360^\circ}{n}$
Number of sides of a polygon	$\frac{360^\circ}{\text{exterior angle}}$

Pythagoras and Trigonometry	
Pythagoras' theorem: find the hypotenuse	$c = \sqrt{a^2 + b^2}$
Pythagoras' theorem: find a non-hypotenuse	$a = \sqrt{c^2 - b^2}$
Trigonometry: Mnemonic to help choose the correct ratio	<b>S O H C A H T O A</b>
Trigonometry: Sine ratio	$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \theta = \sin^{-1}\left(\frac{\text{opp}}{\text{hyp}}\right)$
Trigonometry: Cosine ratio	$\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \theta = \cos^{-1}\left(\frac{\text{adj}}{\text{hyp}}\right)$
Trigonometry: Tangent ratio	$\tan \theta = \frac{\text{opp}}{\text{adj}} \quad \theta = \tan^{-1}\left(\frac{\text{opp}}{\text{adj}}\right)$

Statistics	
The angle for 1 person or thing	$\frac{360^\circ}{\sum \text{frequency}}$
Position of the median value	$\frac{\text{Odd}}{n+1}, \frac{\text{Even}}{n}, \frac{n}{2}, \frac{n}{2} + 1$
Interquartile range	$\text{upper quartile} - \text{lower quartile}$ $UQ-LQ$

Compound Measures	
Speed	$\frac{\text{distance}}{\text{time}} \quad \begin{array}{c} d \\ s \\ t \end{array}$
Pressure	$\frac{\text{force}}{\text{area}} \quad \begin{array}{c} f \\ p \\ a \end{array}$
Density	$\frac{\text{mass}}{\text{volume}} \quad \begin{array}{c} m \\ D \\ v \end{array}$

Rules of Indices	
Multiplying	$a^m \times a^n = a^{m+n}$
Dividing	$\frac{a^m}{a^n} = a^{m-n}$
Raising to another power	$(a^m)^n = a^{mn}$
Anything to the power of zero	$a^0 = 1$
Negative index	$a^{-m} = \frac{1}{a^m}$

Sequences	
Nth term: Linear (arithmetic) sequence	$U_n = dn + (a-d) \quad a = \text{first term}$ $d = \text{difference}$
Nth term: Geometric sequence	$U_n = ar^{n-1} \quad a = \text{first term}$ $r = \text{common ratio}$

Unit Conversion	
Converting between lengths: cm and m	$\begin{array}{c} \xrightarrow{+100} \\ \text{cm} \quad \text{m} \\ \xleftarrow{\times 100} \end{array}$
Converting between areas: cm <sup>2</sup> and m <sup>2</sup>	$\begin{array}{c} \xrightarrow{+10000} \\ \text{cm}^2 \quad \text{m}^2 \\ \xleftarrow{\times 10000} \end{array}$
Converting between volumes: cm <sup>3</sup> and m <sup>3</sup>	$\begin{array}{c} \xrightarrow{+1000000} \\ \text{cm}^3 \quad \text{m}^3 \\ \xleftarrow{\times 1000000} \end{array}$

## Formulae for GCSE – Higher tier

Percentages	
Compound interest / Growth and Decay	$\left(1 \pm \frac{\%}{100}\right)^n \times \text{original}$
Original amount (reverse percentage)	$\frac{\text{new amount}}{\left(1 \pm \frac{\%}{100}\right)}$
Percentage change (percentage increase or decrease)	$\frac{\text{difference}}{\text{original}} \times 100$
Percentage score	$\frac{\text{score}}{\text{total available}} \times 100$

Angles in Polygons	
Sum of interior angles of a polygon	$180(n-2)$
Relationship between interior and exterior angles of a polygon	$\text{interior} + \text{exterior} = 180^\circ$
Exterior angle of a polygon	$\frac{360^\circ}{n}$
Number of sides of a polygon	$\frac{360^\circ}{\text{exterior angle}}$

Pythagoras and Trigonometry	
Pythagoras' theorem: find the hypotenuse	$c = \sqrt{a^2 + b^2}$
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Trigonometry: Mnemonic to help choose the correct ratio	<b>S O H C A H T O A</b>
Trigonometry: Sine ratio	$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \theta = \sin^{-1}\left(\frac{\text{opp}}{\text{hyp}}\right)$
Trigonometry: Cosine ratio	$\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \theta = \cos^{-1}\left(\frac{\text{adj}}{\text{hyp}}\right)$
Trigonometry: Tangent ratio	$\tan \theta = \frac{\text{opp}}{\text{adj}} \quad \theta = \tan^{-1}\left(\frac{\text{opp}}{\text{adj}}\right)$
Cosine rule: find a side	$a^2 = b^2 + c^2 - 2bc \cos A$
Cosine rule: find an angle	$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$
Sine rule: find a side	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Sine rule: find an angle	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Area of a triangle (trigonometry)	$A = \frac{1}{2} ab \sin C$

Statistics	
The angle for 1 person or thing	$\frac{360^\circ}{\sum \text{frequency}}$
Position of the median value	$\frac{\text{Odd}}{n+1}, \frac{\text{Even}}{n}, \frac{n}{2}, \frac{n}{2} + 1$
Frequency density (histogram)	$\frac{\text{frequency}}{\text{class width}}$
Interquartile range	$\text{upper quartile} - \text{lower quartile}$ $UQ-LQ$

Compound Measures	
Speed	$\frac{\text{distance}}{\text{time}} \quad \begin{array}{c} d \\ s \\ t \end{array}$
Pressure	$\frac{\text{force}}{\text{area}} \quad \begin{array}{c} f \\ p \\ a \end{array}$
Density	$\frac{\text{mass}}{\text{volume}} \quad \begin{array}{c} m \\ D \\ v \end{array}$

Rules of Indices	
Multiplying	$a^m \times a^n = a^{m+n}$
Dividing	$\frac{a^m}{a^n} = a^{m-n}$
Raising to another power	$(a^m)^n = a^{mn}$
Anything to the power of zero	$a^0 = 1$
Negative index	$a^{-m} = \frac{1}{a^m}$
Unit fractional index	$a^{\frac{1}{n}} = \sqrt[n]{a}$
Any fractional index	$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$

Sequences	
Nth term: Linear (arithmetic) sequence	$U_n = dn + (a-d) \quad a = \text{first term}$ $d = \text{difference}$
Nth term: Geometric sequence	$U_n = ar^{n-1} \quad a = \text{first term}$ $r = \text{common ratio}$







# MATHS REVISION TIPS



## Get organised

To be successful at revision it is important that you know what you need to do. Use your revision checklist/QLA to make a list of all the topics that you need to cover.



## Make a plan

Plan exactly when you are going to revise and be strict with yourself. Break your revision sessions into manageable chunks and plan rest breaks in.



## Do maths

Don't just read through the textbook!

**The only way to revise maths is to do maths.**

You will do much better spending 20 minutes doing maths questions than spending two hours just reading a textbook.



# MATHS REVISION TIPS



**Be strategic  
with revision  
topics**

Don't just practice the topics you can do. Although it can be painful, work your way through the topics that you struggle with (use your QLA), because it's better to struggle at home, then seek help, than it is to struggle in the exam.



**Ask for help!**

Once you're in your exam, you're on your own. Use the time now to seek help on topics you are struggling with. This can be from your teacher, friends, someone at home or using videos from our recommended websites.



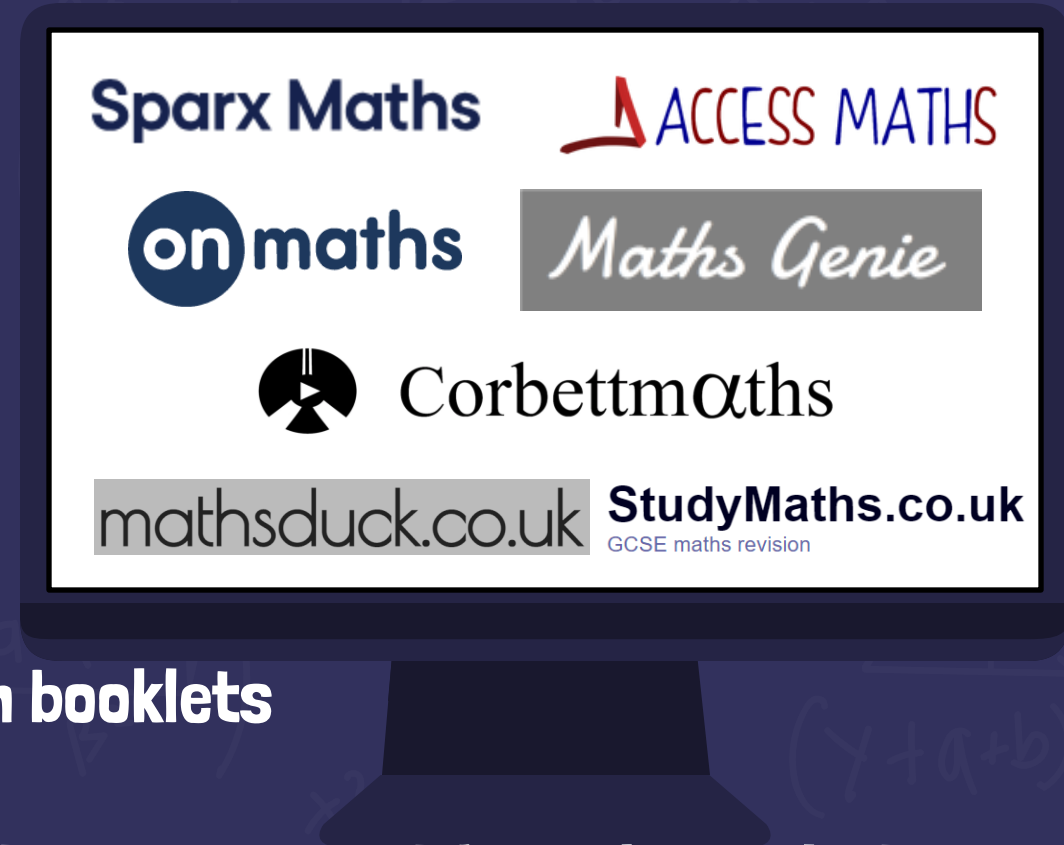
**Practice  
exam  
conditions!**

Once you have gained some confidence, work on questions, in silence, with no help, for a fixed amount of time. This will get you used to what it will be like in the exam, how fast you need to go, and is the best way of checking that you really understand a topic.



# STUDY RESOURCES

- Sparx Maths – Key skills and video guides
- On Maths – Online papers providing immediate feedback.
- Access Maths – Revision Mats, Daily Maths calendars.
- Corbett Maths – videos, worksheets and exam booklets
- Maths Genie – Exam questions grouped by topic and grade with worked solutions.
- Study Maths – Revision notes, worksheets and a large bank of questions.
- Maths Duck – Recall activities and formulae quizzes.





# MATHS REVISION EXAMPLE – AREA OF A CIRCLE



**Do you have the knowledge?**

Most people struggle to learn maths by reading. Get input from your teacher or a video. For area of a circle, we need to know the formula, substitution, exact values, how to use our calculator and rounding. Making clear notes from guided examples is important before you start trying to tackle questions.



**Practice**

The only way to get confident is to find the area of lots of circles! Start with basic questions and build up to exam questions. Area of a circle exam questions can involve working backwards to find the radius, compound area or tackling worded problems in context. We need exposure to all of this to be exam confident!



**Revisit with recall**

Make sure you come back and try questions again regularly. This allows knowledge to stick in your long-term memory! If you are using Sparx Maths as a revision tool it has a great consolidation feature. Corbett 5 a day and regular exam practice are also good ways to mix up retention topics!



# STRATEGIES MOVING FORWARD



**What can parents do to support their children through their GCSEs?**

- **Give guidance for revision techniques.**
- **Help draw up a realistic revision timetable.**
- **Keep them motivated – ensure they have a positive working environment.**
- **Check in with them regularly – be supportive throughout the whole process, and make sure they are properly equipped for revision. This can include resources and equipment.**
- **Quiz them – Formulae, methods, topics etc.**