Core Examinations Event

FRED LONGWORTH HIGH SCHOOL



Timings:

- **Sessions 1 and 2** (**English** and **Maths**) will take place in this room until approx. 7pm.
- **Session 3** (**Science**) will take place in the main hall until approx. 7:30pm.

Aims of the evening:

- To provide you and your child with **specific** revision strategies for core subjects to be used in the upcoming mock examinations, and in the final approach to the GCSEs.
- To offer practical advice to parents for helping your child to complete effective revision.

Year 11 Examinations Night

FRED LONGWORTH HIGH SCHOOL

Maths Higher Tier

Exam dates…

Paper 1 : Friday 14th May 2027

Paper 2 : Thursday 27th May 2027

Paper 3 : Monday 14th June 2027

Paper 1

Question	Topic	Max Score	Actual	%	MW clip
q1	Inequalities	2	2	100%	139
q2	Product of Prime Factors	2	2	100%	78
q3	Ratio, Fractions and Percentage Problems	5	5	100%	106/72/87
q4a	Standard Form small	1	0	0%	83
q4b	Standard Form big	1	1	100%	83
q4c	Standard Form multiplication	2	0	0%	83
q5	Angles in Polygons	3	0	0%	123
q6a	Table of Values	2	0	0%	98
q6b	Drawing Quadratic Graphs	2	0	0%	98
q6c	Estimating Roots from Quadratic Graphs	2	0	0%	160
q7	Reverse combined mean	3	0	0%	62
q19a	Simplify and add surds	2	0	0%	207a
q19b	Multiply and rationalise surds	3	0	0%	207c
q10	Linear Simultaneous Equations	4	1	25%	162
q11	Surface Area of a Composite Solid	3	0	0%	114a
q12a	Cumulative Frequency table	1	0	0%	186
q12b	Draw a Cumulative Frequency curve	2	0	0%	186
q12c	Reading from a Cumulative Frequency curve	1	0	0%	186
q12d	Interquartile range from a Cumulative Frequency curve	2	0	0%	186
q13	Recurring Decimals	3	1	33%	177/189
q14a	Indices power of a half	1	0	0%	188
q14b	Indices power of zero	1	0	0%	154
q14c	Indices negative fractional	2	0	0%	154/188
q15	Ratio (using fractions - harder)	4	0	0%	107
q16a	Estimate volume of cone	3	0	0%	171
q16b	Estimate volume of cone reasoning	1	0	0%	171
q17	Fractional and Negative Indices	4	0	0%	26b/154/188
q18	Probability of dependent events	4	0	0%	175
q19a	Simplify and add surds	2	0	0%	207a
q19b	Multiply and rationalise surds	3	0	0%	207c
q20a	Completing the square	2	0	0%	209a
q20b	Completing the square turning point	1	0	0%	209c
q21	Quadratic simultaneous equations	5	0	0%	211

Year 11 Examinations Night

FRED LONGWORTH HIGH SCHOOL

Maths Higher Mock Revision List

Paper 1: Wed 2nd Dec, 2026

Paper 2: Tues 8th Dec, 2026

Paper 1	Paper 2
Algebraic fractions (adding and subtracting)	HCF/LCM
Basic inverse proportion	3D trig
Box Plots	Angles in polygons
Combining ratios	~~Area/Circumference of Circles~~
Completing the square and finding the turning point	Calculating with surds
Exact trig values	~~Capture recapture~~
Expanding triple brackets	Circle theorems
Expressing a quantity as a %	Compound interest
Forming and solving equations (area)	Distance time graphs
Fractions of an amount	Error intervals
Histograms	Expanding double brackets
Inequality regions	Forming and solving equations (volume)
Laws of indices	Iteration
Multiplying decimals	Non-linear simultaneous equations
Nth term	Percentages of an amount
Percentage change	Product rule for counting
Probability	~~Pythagoras~~
Recurring decimals	Rationalising the denominator
Repeated percentage change	~~Reverse mean~~
Scatter graphs	Sectors
Similar shapes – area and volume	Sharing a ratio
Solving a quadratic equation	Solving linear equations (2 unknowns)
Surface area problems (spheres)	Standard form
Types of graphs	Tree diagrams
Volume and surface area of a cube	Venn-diagrams

Year 11 Examinations Night

FRED LONGWORTH HIGH SCHOOL

Let's pick a topic: SURDS



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What do you know already?

Simplify $\sqrt{54}$

Simplify $4\sqrt{2} + 3\sqrt{2}$

Simplify $\sqrt{48} - \sqrt{12}$

Simplify $3\sqrt{3} \times 4\sqrt{12}$

Expand and simplify $(3 + \sqrt{8})(5 - \sqrt{2})$

Rationalise $\frac{3}{4\sqrt{3}}$

Rationalise $\frac{\sqrt{2} - 2}{3\sqrt{2} + 4}$

What do you know already?

Simplify $\sqrt{54}$ **$3\sqrt{6}$**

Simplify $4\sqrt{2} + 3\sqrt{2}$ **$7\sqrt{2}$**

Simplify $\sqrt{48} - \sqrt{12}$ **$2\sqrt{3}$**

Simplify $3\sqrt{3} \times 4\sqrt{12}$ **72**

Expand and simplify $(3 + \sqrt{8})(5 - \sqrt{2})$ **$11 + 7\sqrt{2}$**

Rationalise $\frac{3}{4\sqrt{3}}$ **$\frac{\sqrt{3}}{4}$**

Rationalise $\frac{\sqrt{2} - 2}{3\sqrt{2} + 4}$ **$7 - 5\sqrt{2}$**

What can you do to help?

- Remember there are so many maths resources already done and videos to watch (we will go through these).

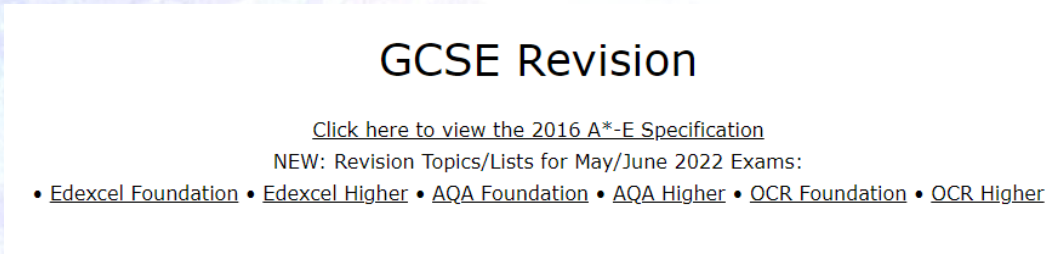
- Encourage your child to use the topic list and focus on topics they find **DIFFICULT**.

- Use resources with answers so you can **check** together.

Surds Revision...

Mathsgenie :

Surds (grade 7)



Grade 7

#	Videos	Exam Questions	Exam Questions Booklet	Solutions
7.1	Surds	Exam Questions	Surds	Solutions

A video with examples

A mixture of GCSE style questions.

All **answers** to the questions with working out to check!

Surds Revision...

Corbett Maths :

Answers are available via the answers section of the website

A textbook exercise to practise fluency

Surds: intro, rules, simplifying Video 305 Practice Questions Textbook Exercise

Surds: addition/subtraction Video 306 Practice Questions Textbook Exercise

Surds: rationalising denominators Video 307 Practice Questions Textbook Exercise

Surds: expanding brackets Video 308 Practice Questions Textbook Exercise

A video with examples

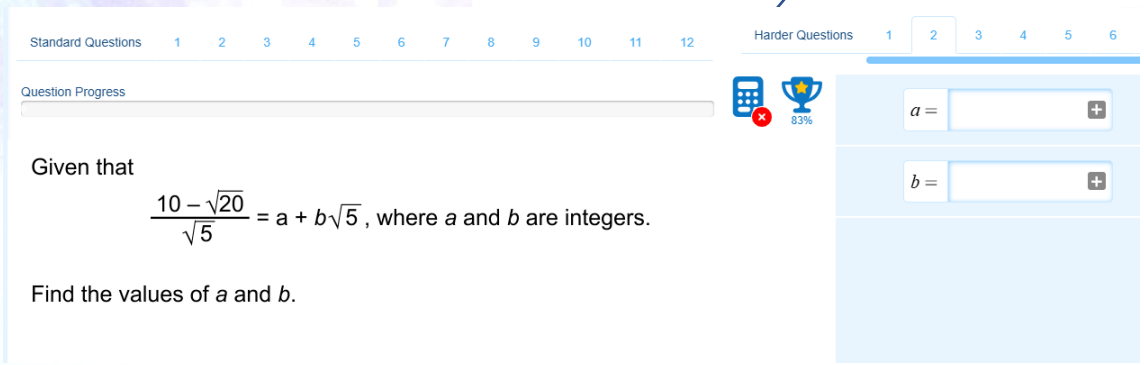
A mixture of GCSE style questions.

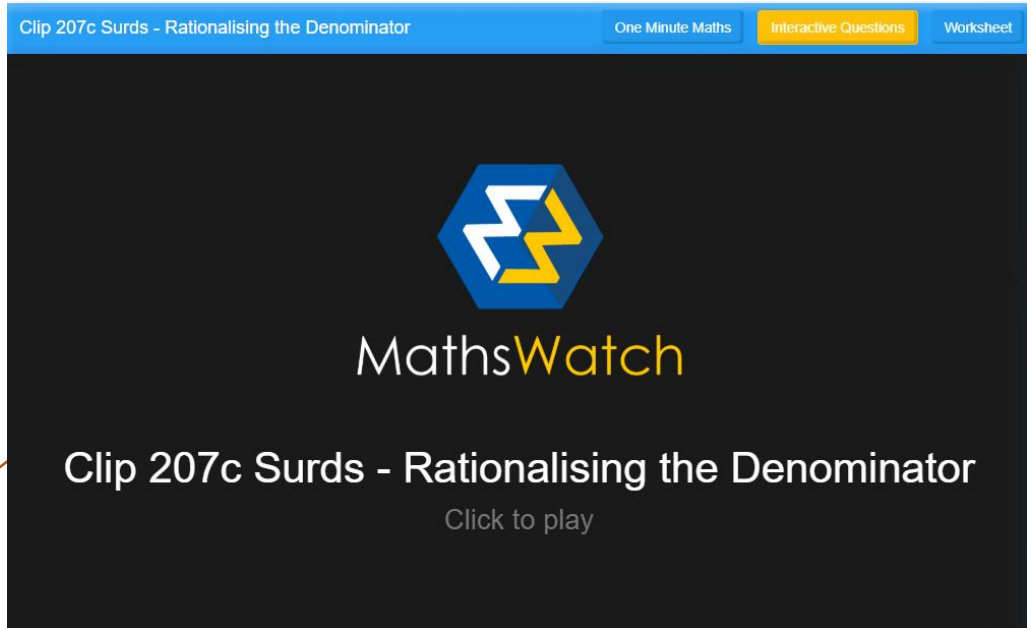
Surds Revision...

Mathswatch...

Interactive questions to try







Video for each

Revision guides and workbooks…

Revision Guide

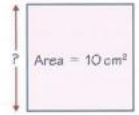
NUMBER

Had a look ☐ Nearly there ☐ Nailed it! ☐

Tricky Topic

Surds 1

You can give exact answers to calculations by leaving some numbers as square roots.



This square has a side length of $\sqrt{10}$ cm.

You can't write $\sqrt{10}$ exactly as a decimal number. It is called a **surd**.

Rules for simplifying square roots

These are the most important rules to remember when dealing with surds:

1. $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ — $\sqrt{8} = \sqrt{4} \times \sqrt{2} = 2\sqrt{2}$
2. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ — $\sqrt{\frac{3}{25}} = \frac{\sqrt{3}}{\sqrt{25}} = \frac{\sqrt{3}}{5}$

You need to remember these rules for your exam.

Worked example

Target grade 7

Show that $\sqrt{45} = 3\sqrt{5}$

Show each stage of your working clearly. **(2 marks)**

$\sqrt{45} = \sqrt{9 \times 5}$

$= \sqrt{9} \times \sqrt{5}$

$= 3\sqrt{5}$

This question says 'Show that…' so you can't use your calculator. You need to show each step of your working clearly:

1. Look for a factor of 45 which is a square number: $45 = 9 \times 5$
2. Use the rule $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ to split the square root into two square roots.
3. Write $\sqrt{9}$ as a whole number.

Rationalising the denominator of a fraction means making the denominator a whole number.

You can do this by multiplying the top **and** bottom of the fraction by the surd part in the denominator.

$\frac{5}{3\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{6}$

The surd part of the denominator is $\sqrt{2}$

Remember that $\sqrt{2} \times \sqrt{2} = 2$

So $3\sqrt{2} \times \sqrt{2} = 3 \times 2 = 6$

Good form

Most surd questions ask you to write a number or answer in a certain **form**.

This means you need to find **integers** for all the letters in the expression.

$6\sqrt{3}$ is in the form $k\sqrt{3}$ ($k = 6$)

The integers can be positive or negative.

$4 - 9\sqrt{2}$ is in the form $p + q\sqrt{2}$ ($p = 4$ and $q = -9$)

You can check your answer by writing down the integer value for each letter.

Now try this

Find factors of 32 and 98 which are square numbers.

Target grade 8

1 Write $\sqrt{32} + \sqrt{98}$ in the form $p\sqrt{2}$ where p is an integer. Show each stage of your working clearly. **(2 marks)**

2 Show that $\frac{35}{\sqrt{7}} = 5\sqrt{7}$ **(2 marks)**

Rationalise the denominator by multiplying top and bottom by $\sqrt{7}$

Target grade 9

3 x is an integer such that $\frac{\sqrt{x} \times \sqrt{18}}{\sqrt{3}} = 8\sqrt{3}$

Find the value of x. **(4 marks)**

NUMBER

Had a go ☐ Nearly there ☐ Nailed it! ☐

Tricky Topic

Surds 1

Target grade 7

Guided

1 Express the following surds in the form $a\sqrt{b}$, where a and b are integers.

(a) $\sqrt{12} = \sqrt{\ldots\ldots} \times \sqrt{3} = \ldots\ldots\sqrt{3}$ **(1 mark)**

Think of two numbers which, when multiplied, give 12, one of which is a square number.

(b) $\sqrt{20} = \sqrt{4} \times \sqrt{\ldots\ldots} = \ldots\ldots$ **(1 mark)**

(c) $\sqrt{48} = \sqrt{\ldots\ldots} \times \sqrt{\ldots\ldots} = \ldots\ldots$ **(1 mark)**

(d) $\sqrt{3} \times \sqrt{27}$ ..... **(2 marks)**

(e) $\sqrt{98} - \sqrt{18}$ ..... **(2 marks)**

(f) $5\sqrt{28} - \sqrt{63}$ ..... **(2 marks)**

Target grade 8

Guided

2 Rationalise the denominator of these expressions.

(a) $\frac{3}{\sqrt{5}}$

$\frac{3}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} =$ ..... **(1 mark)**

(b) $\frac{2}{\sqrt{6}}$

$\frac{2}{\sqrt{6}} \times \frac{\sqrt{\ldots\ldots}}{\sqrt{\ldots\ldots}} = \ldots\ldots = \ldots\ldots$ **(1 mark)**

(c) $\frac{2}{\sqrt{8}}$

..... **(1 mark)**

(d) $\frac{21}{\sqrt{7}}$

..... **(1 mark)**

(e) $\frac{1+\sqrt{3}}{\sqrt{12}}$

..... **(2 marks)**

(f) $\frac{\sqrt{18}+10}{\sqrt{2}}$

..... **(2 marks)**

Target grade 9

3 Solve the following equations where x is an integer.

(a) $\sqrt{45} \times x = \sqrt{180}$

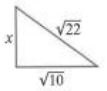
$x =$ ..... **(3 marks)**

(b) $\frac{\sqrt{x} \times \sqrt{24}}{2\sqrt{3}} = \sqrt{20}$

$x =$ ..... **(4 marks)**

Target grade 9

4 Find the length of the side labelled x in the form $a\sqrt{b}$, where a and b are integers.



$x =$ ..... **(3 marks)**

Target grade 9

5 Show that $\frac{1}{1+\frac{1}{\sqrt{3}}}$ can be written as $\frac{3-\sqrt{3}}{2}$ **(3 marks)**

Problem solved! Start by multiplying everything by $\sqrt{3}$.

Revision Workbook

Revision guides and workbooks…

Revision Guide

Had a look ☐ Nearly there ☐ Nailed it! ☐ ALGEBRA

Surds 2

Tricky Topic

You might need to expand brackets involving surds. You can use the grid method, or **FOIL** to expand the brackets (have a look at page 17). Here are two **golden rules** to remember when working with surds.

1 You can use the rule $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ in **both directions:**

$\sqrt{20} \times \sqrt{5} = \sqrt{100} = 10$

$\sqrt{2a} \times \sqrt{18a} = \sqrt{36a^2} = \sqrt{36} \times \sqrt{a^2} = 6a$

2 Whole number parts and surd parts stay **separate:**

If $24 + 6\sqrt{7} = a + b\sqrt{7}$ then you can compare the two expressions to get $a = 24$ and $b = 6$

Worked example

Target grade 6

Show that $(3 + \sqrt{8})(4 + \sqrt{8}) = 20 + 14\sqrt{2}$

Show each stage of your working clearly. **(2 marks)**

$(3 + \sqrt{8})(4 + \sqrt{8}) = 12 + 3\sqrt{8} + 4\sqrt{8} + (\sqrt{8})^2$

$= 12 + 7\sqrt{8} + 8$

$= 20 + 7\sqrt{8}$

$= 20 + 7 \times 2\sqrt{2}$

$= 20 + 14\sqrt{2}$

Problem solved! When the question says 'Show that…', you should start from the **left-hand side**, then simplify and rearrange until your expression matches the **right-hand side.**

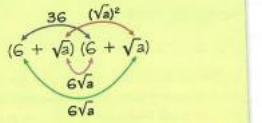
Show all your workings and make sure you **simplify** any surds in your expression:

$\sqrt{8} = \sqrt{4 \times 2}$

$= \sqrt{4} \times \sqrt{2}$

$= 2\sqrt{2}$

There's more about this on page 12.



Simplify the expression, remembering that $(\sqrt{a})^2 = a$, then compare your answer with the right-hand side given in the question. $12\sqrt{a} = 12\sqrt{2}$ so $a = 2$, and $36 + a = b$ so $b = 38$

Worked example

Target grade 7

Given that a and b are positive integers such that $(6 + \sqrt{a})^2 = b + 12\sqrt{2}$

find the value of a and the value of b. **(3 marks)**

$(6 + \sqrt{a})^2 = (6 + \sqrt{a})(6 + \sqrt{a})$

$= 36 + 6\sqrt{a} + 6\sqrt{a} + (\sqrt{a})^2$

$= 36 + a + 12\sqrt{a}$

$= b + 12\sqrt{2}$

$a = 2$ and $b = 38$

Now try this

Target grade 6

1 Show that $(3 - \sqrt{12})^2 = 21 - 12\sqrt{3}$

Show each stage of your working clearly. **(3 marks)**

Target grade 7

2 $(5 + \sqrt{x})(3 + \sqrt{x}) = 18 + k\sqrt{x}$

where x is a prime number and k is a positive integer.

Find the value of x and the value of k. **(3 marks)**

Revision Workbook

Had a go ☐ Nearly there ☐ Nailed it! ☐ ALGEBRA

Surds 2

Tricky Topic

Target grade 6

1 Show that $(4 + \sqrt{3})^2 = 19 + 8\sqrt{3}$

Show each stage of your working clearly.

When the question says 'Show that …' you should start from the left-hand side, then simplify and rearrange until your expression matches the right-hand side.

Guided

$(4 + \sqrt{3})(4 + \sqrt{3}) = \ldots\ldots + \ldots\ldots\sqrt{3} + \ldots\ldots\sqrt{3} + \ldots\ldots$

$= \ldots\ldots + \ldots\ldots\sqrt{3}$ **(3 marks)**

Target grade 6

2 Show that $(\sqrt{2} + \sqrt{3})^2 = 5 + 2\sqrt{6}$

Show each stage of your working clearly.

(3 marks)

Target grade 6

3 Show that $(4 + \sqrt{5})(2 - \sqrt{5}) = 3 - 2\sqrt{5}$

Show each stage of your working clearly.

(3 marks)

Target grade 7

4 a and b are positive integers such that $(1 - \sqrt{a})^2 = b - 2\sqrt{7}$

Find the value of a and the value of b.

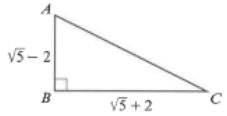
Problem solved! Multiply out the brackets, then compare the whole number terms and the surd terms.

$a = \ldots\ldots$

$b = \ldots\ldots$ **(3 marks)**

Target grade 7

5 The diagram shows a right-angled triangle. All measurements are in cm.



Work out, leaving your answers in surd form where appropriate,

(a) the area of the triangle

$\ldots\ldots$ cm^2 **(3 marks)**

(b) the length of AC.

$\ldots\ldots$ cm **(3 marks)**

Revision cards…

- Remember that **DOING** maths is better than **READING** maths.

- Encourage your child to actually sit and answer questions and **check** them.

- Make some **revision cards**, with a skill/formula on one side, and an example question on the other.

- Tick off once a skill is mastered and highlight what you still need to revise!

Key Notes:

A surd is a square root that cannot be reduced to a whole number.

Simplifying surds

Learn these general rules:

- $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$
- $\sqrt{a} \times \sqrt{a} = a$
- $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} = \sqrt{a \div b}$

Add and subtract surds

To add and subtract surds with different roots, you first need to simplify each surd to see if they can be expressed with the same root.

Front:
The key information and notes

Examples:

Simplifying Surds

$\sqrt{72}$

Largest square number that is a factor of 72

$$\sqrt{72} = \sqrt{36 \times 2}$$
$$= \sqrt{36} \times \sqrt{2} \quad \sqrt{ab} = \sqrt{a} \times \sqrt{b}$$
$$= 6\sqrt{2}$$

Simplify $\sqrt{10} \times \sqrt{5}$.

$\sqrt{10} \times \sqrt{5} = \sqrt{50}$

$50 = 25 \times 2$, so we can write $\sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} = 5\sqrt{2}$

Simplify $\frac{\sqrt{12}}{\sqrt{6}}$.

$\frac{\sqrt{12}}{\sqrt{6}} = \sqrt{\frac{12}{6}} = \sqrt{12 \div 6} = \sqrt{2}$

Adding and subtracting surds

$\sqrt{27} - \sqrt{12}$
$= \sqrt{9}\sqrt{3} - \sqrt{4}\sqrt{3}$
$= 3\sqrt{3} - 2\sqrt{3}$
$= \sqrt{3}$

Back:
Examples

Revision sessions…

Wednesday after school, 3:15pm

Mrs Roylance – M7
(overspill with Mr Bradley in M9)

Mrs Hilton – M2
Mrs Taylor – M6

Other things to note…

We have concerns regarding inappropriate use of AI for completing homework and revision tasks.

If your child misses a maths lesson, it is their responsibility to catch up on missed work, as we don't have time to reteach content.

Revision guides and workbooks are available to order from school for £6 (total). You can send the cash in or pay on wisepay.

To summarise…

- **Mathswatch** – the videos are great for learning the skills and the interactive questions provide you with instant feedback.
- **Corbett Maths** – another way to watch videos and practice what you have learnt. All questions have answers attached.
- **Mathsgenie** – great for exam style questions. All exam questions have worked solutions.
- **Self Directed Study Hub** – on the school website. Past papers available, revision list.