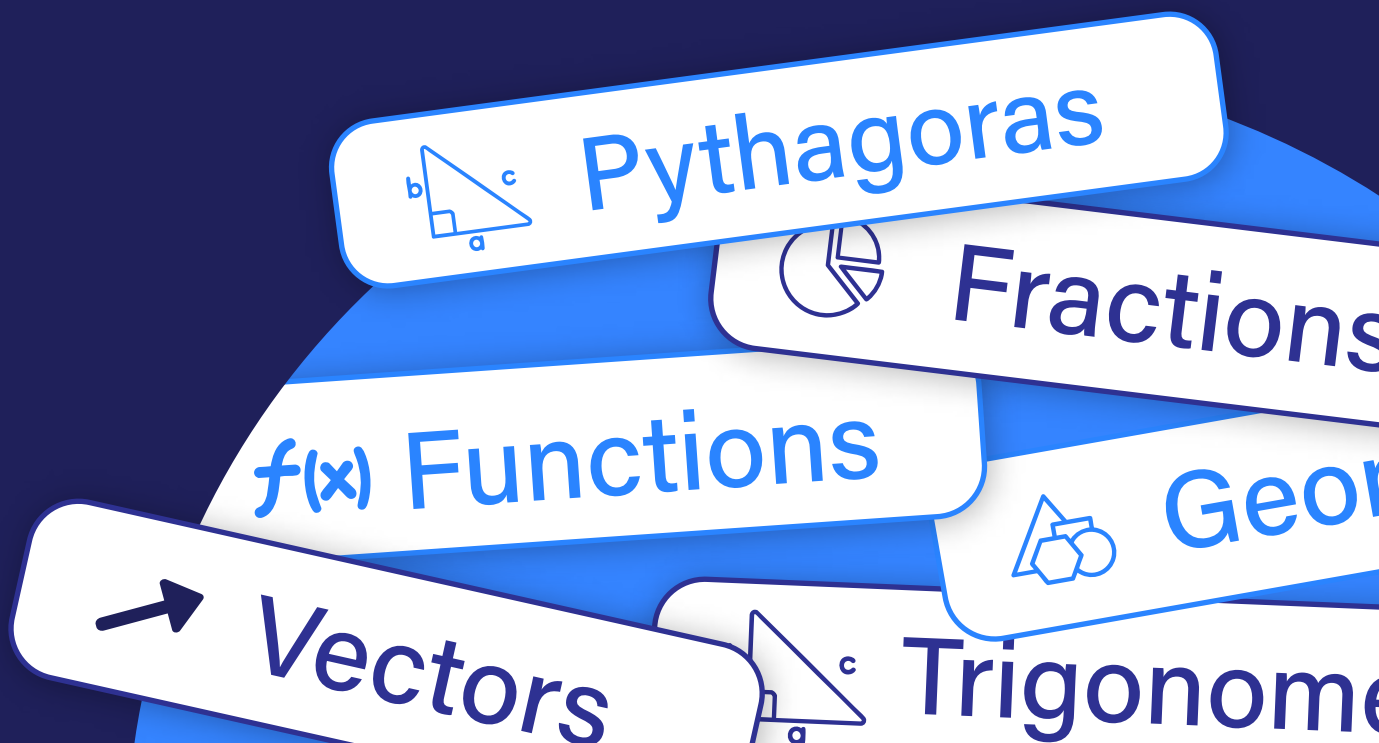
MathsBox

Years 10 and 11

What's available for GCSE Maths.

An overview of the GCSE Maths topics available in the Mathsbox Question Generator.



Contents.

Getting Started with Mathsbox.

Whether you're looking for Primary, Secondary, or A-Level resources, we've got you covered.

Question Generator

Our popular Question Generator gives you the tools to create unlimited resources with answers tailored to your lesson plans.

Over 2,000 question structures from the UK Curriculum to select from. Simply choose your resource type, select your topics, and generate unlimited questions and resources(with answers)

This document contains the full list of topics and question structures for GCSE Maths - available to select from in our Question Generator.

1

Select
Resource Type

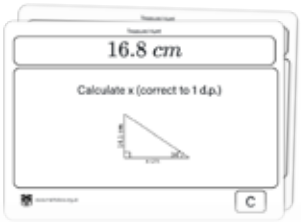
Choose your resource format to print or project ready to slot into your lesson plans

2

Select
Topics

Select your question structures from over 2000 topics covering the curriculums from KS2 to KS5

3



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Resources!

Generate endless unique resources and answers at the click of a button!

Ready-Made Resources

Over 8,000 ready-made resources available, you'll find a variety of formats including worksheets, questions to project, treasure hunts, bingo games, and much more to support your lessons.

Number - GCSE Maths.

Non-calculator methods

Addition and Subtraction - integers

- Add a 2 digit to a 3 digit number
- Add two 3 digit numbers
- Add two 4-digit numbers
- Addition - More than 4 digits
- Subtract a 2 digit from a 3 digit numbers
- Subtract two 3 digit
- Subtract two 4-digit numbers
- Subtraction - More than 4 digits

Addition and Subtraction - decimals

- Add decimals - same number of d.p
- Add decimals (up to 2 d.p)
- Add decimals (up to 3 d.p)
- Subtract decimals (same d.p)
- Subtract decimals (up to 2 d.p.)
- Subtract decimals (up to 3 d.p.)

Addition and Subtraction - fractions

- Add fractions within 1
- Add fractions total greater than 1
- Add any two proper fractions
- Subtract fractions

Multiplication and division - decimals

- Multiplying by 10
- Multiplying by 100
- Multiplying by 1000
- Multiplying by 10,100,1000 missing values
- Multiplying a decimal by an integer
- Multiplying by multiples of 10 or decimals
- Multiplying decimals (written methods)
- Dividing (up to 3 digit number) by 10
- Dividing (up to 3 digit number) by 100
- Dividing (up to 3 digit number) by 1000
- Dividing by 10 (including decimals)
- Dividing by 100 (including decimals)
- Dividing by 1000 (including decimals)
- Missing values ÷ 10, 100, 1000
- Dividing a decimal by an integer

Rounding

- Rounding to the nearest 10
- Rounding to the nearest 100
- Rounding to the nearest 1000

Multiplication and division - integers

- Multiply a 2 digit by a 1 digit number
- Multiply a 3 digit by a 1 digit number
- Multiply a 4 digit by a 1 digit number
- Multiply by 10,100 or 1000
- Multiply by 0.1 or 0.01
- Multiply - 2 digit by 2 digit
- Multiply - 3 digit by 2 digit
- Multiply - 4 digit by 2 digit
- Multiplication - by multiples of 10,100,1000
- Dividing by 10,100 or 1000
- Division - by multiples of 10,100,1000
- 2-digit ÷ 1-digit- with remainders
- 3-digit ÷ 1-digit
- Division - 3 or 2 digit by 1 digit
- Division - 4 digit by 1 digit (with remainders)
- Division - 3 or 4 digit by 2 digit numbers

Multiplication and division - fractions

- Find the product of a pair of unit fractions
- Multiply - fraction by an integer
- Find the product of a pair of proper fractions
- Multiply - mixed number by an integer
- Divide an integer by a fraction
- Dividing a fraction by an integer
- Divide a fraction by a unit fraction
- Divide any pair of fractions

Estimating

- Estimation: (a + b) / c
- Estimation: (a - b) / c
- Estimation: (a × b) / c
- Estimation: a × b
- Estimation: a + b
- Estimation: a - b

Rounding

- Rounding to the nearest integer
- Rounding to 1 decimal place
- Rounding to 2 decimal places
- Rounding to 1 significant figure (integers)
- Rounding to 1 significant figure (decimals)
- Rounding to 2 significant figure (integers)
- Rounding to 2 significant figure (decimals)
- Rounding to 3 significant figure (integers)
- Rounding to 3 significant figure (decimals)

Number - GCSE Maths.

Non-calculator methods

Error intervals

- Error intervals - numbers - nearest integer
- Error intervals - numbers - 1 d.p.
- Error intervals - numbers - 2 d.p.
- Error intervals - numbers - mixture
- Error intervals - measures -nearest integer
- Error intervals - measures -1 d.p.
- Error intervals - measures -nearest 10
- Error intervals - measures -nearest 100
- Error intervals - measures -nearest 1000
- Error intervals - measures -mixture

Bounds

- Min/max radius
- Min/max perimeter
- Min/max containers
- Calculations involving bounds - mixture
- Min/max: (A × B) / C
- Min/max: A / (B × C)
- Min/max: A + B - C
- Min/max: C(A - B)

Using given calculations

- Using known calculations
- Use known facts - multiplication (inc decimals)

Types of numbers

- Finding multiples of a number
- Finding factors
- Listing prime numbers
- Finding the HCF
- Finding the lowest common multiple
- Expressing as a product of prime factors

Surds

Simplifying

- Simplifying: $\sqrt{a}$
- Simplifying: $\sqrt{a} \pm b + \sqrt{a} \pm c$
- Simplifying: $n\sqrt{a} \pm b + m\sqrt{a} \pm c$
- Simplifying: $n\sqrt{a} + \sqrt{b}$
- Simplifying: $n\sqrt{a} \times m\sqrt{a}$
- Simplifying: $\sqrt{a} \times \sqrt{b}$
- Simplifying: $m\sqrt{a} \times n\sqrt{b}$
- Simplifying expressions involving surds

Expanding brackets

- Expanding brackets: $\sqrt{a}(a\sqrt{b} \pm c)$
- Expanding brackets: $\sqrt{a}(b \pm \sqrt{a})$
- Expanding brackets: $a\sqrt{b}(c\sqrt{d} \pm e)$
- Expanding brackets: $(\sqrt{a} \pm b)(\sqrt{a} \pm c)$
- Expanding brackets: $(a\sqrt{b} \pm c)(d\sqrt{b} \pm e)$
- Expanding mixture

Rationalising the denominator

- Rationalising the denominator: $a / \sqrt{b}$
- Rationalising the denominator: $a / (c \pm \sqrt{b})$
- Rationalising the denominator: $(a \pm \sqrt{b}) / (c \pm \sqrt{b})$
- Rationalising the denominator mixture

Fractions, Decimals, and Percentages

Equivalence - Decimals and fractions

- Decimals as fractions
- Fraction as a decimal (1)
- Decimals and fractions - tenths
- Decimals and fractions - hundredths
- Write division as a fraction
- Use division - fraction as a decimal

Number - GCSE Maths.

Fractions, Decimals, and Percentages

Equivalence - Decimals and percentages

- Decimal as a percentage less than 100
- Decimal as a percentage greater than 100
- Percentage as a decimal less than 100
- Percentage as a decimal greater than 100
- Mixture less than 100
- Mixture greater than 100

Equivalence - Percentages and fractions

- Fractions as percentages
- Percentages to fractions (<100)
- Percentages to fractions (>100)

Recurring decimals as fractions

- Recurring decimals as fractions

Percentage calculations- non calc

- 5% of a quantity
- 5% 10% and 15% of quantity
- 5% 10% and 20% of a quantity
- 15% of a quantity
- Multiples of 5%
- Percentages - missing values
- Expressing as a percentage
- Calculate a percentage increase
- Calculate a percentage decrease
- Calculate a percentage change

Ratios and fractions

- Expressing a ratio as a fraction
- Expressing a fraction as a ratio
- Dividing in a given ratio
- Dividing in a given ratio - difference known
- Dividing in a given ratio - one share known
- Find the larger share - smaller known
- Find the smaller share -larger known
- Find the larger share - difference known
- Find the smaller share - difference known

Fraction - calculations - non calc

- Calculate a fraction of a quantity
- Multiply - fraction by an integer
- Find the product of a pair of proper fractions
- Multiply - mixed number by an integer
- Find the whole -given a fraction

Percentages and Interest

Percentages and Interest

- Calculating a percentage of a quantity (calc)
- Identifying multipliers for percentage increases
- Identifying multipliers for percentage decreases
- Increasing by a given percentage (calc)
- Decreasing by a given percentage (calc)
- Calculate the percentage increase
- Calculate the percentage decrease
- Calculate the percentage change
- Calculating compound interest
- Calculate the total (compound interest)
- Calculating the number of years (compound)
- Calculate depreciation
- Finding the original < 100%
- Finding the original > 100%
- Calculate time to for a population to reduce to n

Finance

- Calculating change mixture
- Problem solving with money
- Multiply and divide in context
- Simple interest - calculating the total
- Simple interest - calculating the interest
- Calculating the price including VAT
- Calculating Income tax
- Solving best buy problems
- UK currency for foreign currency
- Foreign currency to UK currency
- Exchange rates - comparing prices

Algebra - GCSE Maths.

Equations and Expressions

One-step equations

- One step equations: x + a = b
- One step equations: x - a = b
- One step equations: a - x = b
- One step equations: ax = b
- One step equations: x / a = b
- One step equations mixture

Equations with fractions

- Equations with fractions: x / a - b = c
- Equations with fractions: x / a + b = c
- Equations with fractions: (x + a) / b = c
- Equations with fractions: (x - a) / b = c
- Equations with fractions: a - x / b = c
- Equations with fractions: (x / a) + b = cx + d
- Equations with fractions: (x / a) - b = cx + d
- Equations with fractions: (x / a) + b = cx - d
- Equations with fractions: (x / a) - b = cx - d
- Equations with fractions: b - (x / a) = cx + d
- Equations with fractions: b - (x / a) = cx + d
- Equations with fractions: (x / a) + b = (x / c) + d
- Equations with fractions: (x / a) - b = (x / c) + d
- Equations with fractions: (x / a) + b = (x / c) - d
- Equations with fractions: (x / a) - b = (x / c) - d
- Equations with fractions: (x / a) + b = d - (x / c)
- Equations with fractions: (x / a) - b = d - (x / c)
- Equations with fractions: (x / a) + (x / b) = c
- Equations with fractions: (x / a) - (x / b) = c
- Equations with fractions: (x / a) + (x / b) = cx + d
- Equations with fractions: (x / a) - (x / b) = cx + d
- Equations with fractions: (x / a) + (x / b) = cx - d
- Equations with fractions: (x / a) - (x / b) = cx - d
- Equations with fractions: (x / a) + (x / b) = e - dx
- Equations with fractions: (x / a) - (x / b) = e - dx
- Equations with fractions - mixture

Linear Inequalities

- Solving: x + a <> b
- Solving: x - a <> b
- Solving: x ± a <> b
- Solving: ax + b <> c
- Solving: ax - b <> c
- Solving: ax ± b <> c
- Solving: (x / a) - b <> c
- Solving: (x / a) + b <> c

Two step equations

- Positive solutions: ax + b = c
- Positive solutions: ax - b = c
- Positive solutions: a - bx = c
- Negative solutions: ax + b = c
- Negative solutions: ax - b = c
- Negative solutions: a - bx = c
- Positive mixture
- Positive/Negative mixture

Brackets

- Solving: a(bx + c) = d
- Solving: a(bx - c) = d
- Solving: a(c - bx) = d
- Solving: a(bx + c) + d = e
- Solving: a(bx - c) + d = e
- Solving: a(bx + c) - d = e
- Solving: a(bx - c) - d = e
- Solving: a(b - cx) + d = e
- Solving: a(b - cx) - d = e
- Equations with brackets - mixture

Unknown on both sides

- Both sides: ax + b = x + c
- Both sides: ax - b = x + c
- Both sides: ax + b = x - c
- Both sides: ax - b = x - c
- Both sides: ax + b = c - x
- Both sides: ax - b = c - x
- Both sides: ax + b = cx + d
- Both sides: ax - b = cx + d
- Both sides: ax + b = cx - d
- Both sides: ax - b = cx - d
- Both sides: ax + b = d - cx
- Both sides: ax - b = d - cx
- Both sides: a(bx + c) = dx + e
- Both sides: a(bx - c) = dx + e
- Both sides: a(bx + c) = dx - e
- Both sides: a(bx - c) = dx - e
- Both sides: a(c - bx) = dx + e
- Both sides: a(c - bx) = dx - e
- Both sides - mixture

Algebra - GCSE Maths.

Equations and Expressions

Linear Inequalities

- Solving: (x + a) / b <> c
- Solving: (x - a) / b <> c
- Solving: a(bx + c) <> d
- Solving: a(bx - c) <> d
- Solving: a(bx ± c) <> d
- Solving: a(b - cx) <> d
- Solving: a - (x / a) <> d
- Solving: (a - x) / b <> d
- Solving mixture

Quadratic inequalitites

- Solving: $x^2 - bx + c \geq 0$
- Solving: $x^2 - bx + c \leq 0$
- Solving: $x^2 - bx - c \geq 0$
- Solving: $x^2 - bx - c \leq 0$
- Solving: $x^2 + bx - c \geq 0$
- Solving: $x^2 + bx - c \leq 0$
- Solving: $x^2 + bx + c \geq 0$
- Solving: $x^2 + bx + c \leq 0$
- Solving mixture

Simultaneous equations

- Find pairs of values
- Solve problems with two unknowns
- Solve: x + y = r, x - y = s
- Solve: ax + by = r, ax - y = s
- Solve: ax + by = r, ax + y = s
- Solve: ax - by = r, ax - y = s
- Solve: ax + by = r, x - by = s
- Solve: ax - by = r, x - by = s
- Solve: ax + by = r, x + by = s
- Solve: ax + by = r, cx + dy = s
- Solve: ax - by = r, cx - dy = s

Linear Inequalities - integer solutions

- Integers: Smallest value: ax + b > c
- Integers: Smallest value: ax - b > c
- Integers: Largest value: ax - b < c
- Integers: Largest value: ax + b < c
- Integer solutions - mixture

Quadratic equations

- Factorise and solve: $x^2 + ax = 0$
- Factorise and solve: $x^2 - ax = 0$
- Factorise and solve: $ax^2 + bx = 0$
- Factorise and solve: $ax^2 - bx = 0$
- Factorise and solve mixture: $ax^2 \pm bx = 0$
- Factorise and solve: $x^2 + bx + c = 0$
- Factorise and solve: $x^2 \pm bx - c = 0$
- Factorise and solve: $x^2 \pm bx + c = 0$
- Factorise and solve: $x^2 \pm bx + c = 0$ (repeated root)
- Factorise and solve mixture: $x^2 \pm bx \pm c = 0$
- Factorise and solve: $ax^2 + bx + c = 0$
- Factorise and solve: $ax^2 \pm bx - c = 0$
- Factorise and solve: $ax^2 - bx + c = 0$
- Factorise and solve: $ax^2 \pm 2abx + b^2 = 0$
- Factorise and solve mixture: $ax^2 \pm bx \pm c = 0$

Simultaneous equations

- Solve: ax - by = r, cx + dy = s
- Quadratic / Linear: $y = x^2 + bx + c$, $y = dx + e$

Simplifying and Forming Expressions

- Multiplying terms: ax^m × b x^n
- Dividing terms: ax^n y^m ÷ cx
- Simplifying: (ax^n)^m
- Forming single step expressions
- Forming 1 and 2 step equations

Expanding and Factorising

Expanding single brackets

- Expanding: a(bx + c)
- Expanding: a(bx - c)
- Expanding: a(b - cx)
- Expanding: ax(bx + c)
- Expanding: ax(bx - c)
- Expanding: ax(b - cx)

Factorising single bracket

- Factorising: ax + b
- Factorising: ax - b
- Factorising: a - bx
- Factorising: $ax^2 + bx$
- Factorising: $ax^2 - bx$
- Factorising: $bx - ax^2$

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Expanding and Factorising

Expanding binomials

- Expanding: $(x + a)(x + b)$
- Expanding: $(x - a)(x - b)$
- Expanding: $(x + a)(x - b)$
- Expanding: $(x - a)(x + b)$
- Expanding: $(x + a)^2$
- Expanding: $(x - a)^2$
- Expanding: $(x - a)(x + a)$
- Expanding: $(ax + b)(cx + d)$
- Expanding: $(ax - b)(cx + d)$
- Expanding: $(ax + b)(cx - d)$
- Expanding: $(ax - b)(cx - d)$
- Expanding: $(ax + b)^2$
- Expanding: $(ax - b)^2$

Solve quadratics by factorisation

- Factorise and solve: $x^2 + ax = 0$
- Factorise and solve: $x^2 - ax = 0$
- Factorise and solve: $ax^2 + bx = 0$
- Factorise and solve: $ax^2 - bx = 0$
- Factorise and solve: $x^2 + bx + c = 0$
- Factorise and solve: $x^2 \pm bx - c = 0$
- Factorise and solve: $x^2 \pm bx + c = 0$
- Factorise and solve: $x^2 \pm bx + c = 0$ $(x = a)$
- Factorise and solve: $ax^2 + bx + c = 0$

Factorising quadratic expressions

- Factorising: $x^2 + bx + c$
- Factorising: $x^2 \pm bx - c$
- Factorising: $x^2 - bx + c$
- Factorising: $x^2 \pm 2ax + a^2$
- Factorising: $ax^2 + bx + c$
- Factorising: $ax^2 \pm bx - c$
- Factorising: $ax^2 - bx + c$
- Factorising: $(ax + b)^2$
- Factorising: $(ax - b)^2$

Expressing in completed square form

- Expressing in the form: $(x \pm a)^2 + b$
- Expressing in the form: $(x \pm a)^2 + b$

Solving using the quadratic formula

- Solving using the quadratic formula

Solve quadratics by factorisation

- Factorise and solve: $ax^2 \pm bx - c = 0$
- Factorise and solve: $ax^2 - bx + c = 0$
- Factorise and solve: $ax^2 \pm 2abx + b^2 = 0$

Changing the subject

Solving equations

- Equations (2 step)
- Equations with fractions
- Equations with brackets
- Variable on both sides

Solving Inequalities

- Simple inequalities
- Listing integers solutions
- Single integer solutions
- Solving inequatitiles

Rearranging -One-step formula

- Change the subject 1 step: $y = x + a$
- Change the subject 1 step: $y = x - a$
- Change the subject 1 step: $y = ax$
- Change the subject 1 step: $y = a / x$
- Change the subject 1 step: $y = x / a$
- Change the subject 1 step: $y = a - x$
- Change the subject mixture

Rearranging - Two-step formula

- Rearranging to the form $y = mx + c$
- Rearrange two step: $y = x / a + b$
- Rearrange two step: $y = x / a - b$
- Rearrange two step: $y = (x + a) / b$
- Rearrange two step: $y = (x - a) / b$
- Rearrange two step – mixture

Algebra - GCSE Maths.

Changing the subject

Rearranging - Complex formula

- Rearrange complex: $y = \sqrt{(x + a)}$
- Rearrange complex: $y = \sqrt{(x - a)}$
- Rearrange complex: $y = \sqrt{(a - x)}$
- Rearrange complex: $y = \sqrt{x} / a$
- Rearrange complex: $y = a / \sqrt{x}$
- Rearrange complex: $y = \sqrt{(a / x)}$
- Rearrange complex: $y = \sqrt{(x / a)}$
- Rearrange complex: $y = \sqrt{x} + a$
- Rearrange complex: $y = \sqrt{x} - a$
- Rearrange complex: $y = -\sqrt{x}$
- Rearrange complex formula – mixture

Subject appears more than once

- Appears twice: $ax = bx + c$
- Appears twice: $ax = c - bx$
- Appears twice: $ax + b = cx + d$
- Appears twice: $ax - b = cx + d$
- Appears twice: $ax - b = d - cx$
- Appears twice: $ax + b = d - cx$
- Appears twice: $(x + a) / (x + b) = c$
- Appears twice: $(x - a) / (x + b) = c$
- Appears twice: $(x + a) / (x - b) = c$
- Appears twice: $ax - b = cd - d$
- Appears twice: $x / (x - b) = c$
- Appears twice: $x / (x + b) = c$
- Appears twice: $(ax + b) / (cx + d) = e$
- Appears twice: $(ax - b) / (cx + d) = e$
- Appears twice: $(ax - b) / (cx - d) = e$
- Appears twice – mixture

Functions

Substitution Positive Integers

- Substitution: $x + a$
- Substitution: $x - a$
- Substitution: ax
- Substitution: a / x
- Substitution: $y = ax + b$
- Substitution: $y = ax - b$
- Substitution: $y = b - ax$
- Substitution: $y = x / a + b$
- Substitution: $y = (x + a) / b$
- Substitution: $y = (x - a) / b$
- Substitution: $y = (ax + b) / c$
- Substitution: $y = (ax - b) / c$
- Substitution: $y = ax^2$
- Substitution: $y = ax^2 + b$
- Substitution: $y = ax^2 - b$
- Substitution: $y = b - ax^2$
- Substitution: $y = (ax^2) / b$
- Substitution: $y = (ax^2) / b + c$
- Substitution: $y = (ax^2) / b - c$
- Substitution: $y = \sqrt{(ax + b)}$
- Substitution: $y = \sqrt{(b - ax)}$
- Substitution: $y = a\sqrt{x} + b$
- Substitution: $y = b - a\sqrt{x}$
- Substitution: $y = \sqrt{((x + a) / b)}$
- Substitution: $y = \sqrt{((x + a) / b)}$

Substitution Positive Integers

- Substitution: $y = \sqrt{(b(x + a))}$
- Substitution: $y = a / \sqrt{(x + b)}$
- Substitution: $y = x^2 \pm x$
- Substitution: $y = ax^2 \pm x$
- Substitution: $y = x^2 \pm ax$
- Substitution: $y = ax^2 \pm bx$
- Substitution: $y = x^2 \pm bx + c$
- Substitution: $y = bx - ax^2 \pm c$
- Substitution: $y = ax^3 \pm bx^2$
- Substitution: $y = ax^3 \pm bx^2 \pm cx \pm d$

Substitution Negative Integers

- Negative integers: $y = x + a$
- Negative integers: $y = x + a$
- Negative integers: $y = a - x$
- Negative integers: $y = ax$
- Negative integers: $y = x / a$
- Negative integers: $y = a / x$
- Negative integers: $y = ax + b$
- Negative integers: $y = ax - b$
- Negative integers: $y = b - ax$
- Negative integers: $y = x / a + b$
- Negative integers: $y = (x + a) / b$
- Negative integers: $y = (x - a) / b$

Algebra - GCSE Maths.

Functions

Substitution Negative Integers

- Negative integers: $y = (ax + b) / c$
- Negative integers: $y = (ax - b) / c$
- Negative integers: $y = ax^2$
- Negative integers: $y = ax^2 + b$
- Negative integers: $y = ax^2 - b$
- Negative integers: $y = b - ax^2$
- Negative integers: $y = (ax)^2 + b$
- Negative integers: $y = (ax^2) / b$
- Negative integers: $y = (ax^2) / b + c$
- Negative integers: $y = (ax^2) / b - c$
- Negative integers: $y = \sqrt{(ax + b)}$
- Negative integers: $y = \sqrt{(b - ax)}$
- Negative integers: $y = \sqrt{((x + a) / b)}$
- Negative integers: $y = \sqrt{(b(x - a))}$
- Negative integers: $y = a / \sqrt{(x + b)}$
- Negative integers: $y = x^2 \pm x$
- Negative integers: $y = ax^2 \pm x$
- Negative integers: $y = x^2 \pm ax$
- Negative integers: $y = ax^2 \pm bx$
- Negative integers: $y = x^2 \pm bx \pm c$
- Negative integers: $y = bx - ax^2 \pm c$
- Negative integers: $y = ax^3 \pm bx^2$
- Negative integers: $y = ax^3 \pm bx^2 \pm cx \pm d$

Inverse Functions

- Inverse functions: $x - a$
- Inverse functions: $x + a$
- Inverse functions: $a - x$
- Inverse functions: ax
- Inverse functions: x / a
- Inverse functions: a / x
- Inverse functions: $ax + b$
- Inverse functions: $b - ax$
- Inverse functions: $ax - b$
- Inverse functions: $(x + b) / a$
- Inverse functions: $(x - b) / a$
- Inverse functions: $(b - x) / a$
- Inverse functions: $a / (x + b)$
- Inverse functions: $a / (x - b)$
- Inverse functions: $x / a + b$
- Inverse functions: $x / a - b$
- Inverse functions: $\sqrt{x}$
- Inverse functions: $a\sqrt{x}$
- Inverse functions: $\sqrt{(x + a)}$
- Inverse functions: $\sqrt{(x - a)}$
- Inverse functions: $\sqrt{(a - x)}$

Function notation - Evaluating

- Evaluating functions: $ax^2 - b$
- Evaluating functions: $b - ax^2$
- Evaluating functions: $(ax)^2 + b$
- Evaluating functions: $(ax^2) / b$
- Evaluating functions: $(ax^2) / b + c$
- Evaluating functions: $(ax^2) / b - c$
- Evaluating functions: $\sqrt{(ax + b)}$
- Evaluating functions: $\sqrt{(b - ax)}$
- Evaluating functions: $\sqrt{((x + a) / b)}$
- Evaluating functions: $x^2 + x$
- Evaluating functions: $ax^2 \pm x$
- Evaluating functions: $x^2 \pm ax$
- Evaluating functions: $ax^2 \pm bx$
- Evaluating functions: $ax - bx^2 \pm c$
- Evaluating functions: $ax^3 \pm bx^2$
- Evaluating functions: $ax^3 \pm bx^2 \pm cx \pm d$

Inverse Functions

- Inverse functions: $\sqrt{x} / a$
- Inverse functions: $a / \sqrt{x}$
- Inverse functions: $\sqrt{(a / x)}$
- Inverse functions: $\sqrt{(x / a)}$
- Inverse functions: $\sqrt{x} + a$
- Inverse functions: $\sqrt{x} - a$
- Inverse functions: $a - \sqrt{x}$
- Inverse functions: $a\sqrt{(x + b)}$
- Inverse functions: $a\sqrt{(x - b)}$
- Inverse functions: $a + \sqrt{(x - b)}$
- Inverse functions: $a - \sqrt{(x - b)}$
- Inverse functions: $a - \sqrt{(x + b)}$
- Inverse functions: $\sqrt{(x + b)} / a$
- Inverse functions: $\sqrt{((x - b) / a)}$
- Inverse functions: $\sqrt{((x + b) / a)}$
- Inverse functions: $\sqrt{x} / a + b$
- Inverse functions: $\sqrt{x} / a - b$
- Inverse functions: $b - \sqrt{x} / a$
- Inverse functions: $\sqrt{(ax + b)}$
- Inverse functions: $\sqrt{(ax - b)}$
- Inverse functions: $\sqrt{(b - ax)}$
- Inverse functions: $\sqrt{x} / a + b$
- Inverse functions – mixture

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Functions

Composite functions

- Composite functions: fg(x), f(x) = ax ± b, g(x) = cx ± d
- Composite functions: gf(x), f(x) = ax ± b, g(x) = cx ± d
- Composite functions: fg(x), f(x) = x^2, g(x) = ax ± b
- Composite functions: g(x), f(x) = x^2, g(x) = ax ± b
- Composite functions: fg(x), f(x) = ax^2, g(x) = bx ± c
- Composite functions: gf(x), f(x) = ax^2, g(x) = bx ± c
- Composite functions: fg(x), f(x) = x^2 ± a, g(x) = x ± b
- Composite functions: gf(x), f(x) = x^2 ± a, g(x) = x ± b
- Composite functions: fg(x), f(x) = a ± bx, g(x) = cx ± d
- Composite functions: gf(x), f(x) = a ± bx, g(x) = cx ± d
- Composite functions – mixture

Sequences

Generating sequences

- Given the first term and rule
- Given an algebraic rule
- Increasing sequence - nth term
- Decreasing sequence - nth term
- Linear sequence - nth term
- Quadratic sequence - nth term

Finding the nth term

- Find the nth term linear - inc
- Find the nth term linear - dec
- Find the nth term linear - mixture
- Find the nth term quadratic
- Find the 10th term - quadratic
- Fraction sequences - nth term
- Find the nth term mixture - lin/quad

Other Sequences

- Continue a fibonacci sequence
- Continue a geometric sequence
- Find missing terms in a geometric sequence
- Recognise a linear sequence
- Fractions and sequences
- Algebraic sequences

Graphs and Coordinate Geometry

Equations of Lines

- Lines parallel to the x-axis
- Lines parallel to the x-axis (Diagram)
- Lines parallel to the y-axis
- Lines parallel to the y-axis (Diagram)
- Lines parallel to the axes
- Lines parallel to the axes (diagram)
- 2 coordinates given

Coordinates on lines

- Does a point lie on y = mx
- Does a point lie on y = mx ± c
- Complete a coordinate for y = x ± c
- Complete a coordinate for y = mx
- Complete a coordinate for y = mx ± c
- Find the mid-point of a line segment
- Identify equations of non-linear graphs

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Graphs and Coordinate Geometry

Finding the Gradient

- Determine which is the steeper line
- Identify the gradient (diagram)
- Identify the gradient of $y = mx \pm c$
- Identify the gradient after rearranging

Finding the intercept

- Identify the y-axis intercept for $y = x \pm a$
- Identify the x-axis intercept for $y = x \pm a$
- Identify the y-axis intercept for $y = mx \pm c$
- Identify the intercept after rearranging

Equation of a straight line- words

- Equation of a line - 2 function machines
- Equation of a line - through (a,b) and (0,c)
- Equation of a line - through (a,b) and (c,d)
- Equation of a line - gradient and y-intercept

Equation of a straight line -diagrams

- $y = mx \pm c$ – positive gradient
- $y = mx \pm c$ – negative gradient
- $y = mx \pm c$
- $ax + by = c$

Equations of parallel lines

- Equation of a line - through (0,a)
- Equation of a line - through (0,a) (rearranging)
- Equation of a line - through (a,b)
- Equation of a line - through (a,b)(rearranging)
- Parallel lines - mixture

Equations of Perpendicular lines

- Equation of a line - through (0,a)
- Equation of a line - through (0,a) (rearranging)
- Equation of a line - through (a,b)
- Equation of a line - through (a,b) (rearranging)
- Perpendicular lines mixture
- Parallel and perpendiclar mixture

Non-linear graphs

Quadratic graphs

- Quadratic graphs – points to plot
- State the vertex of a quadratic graph
- Complete the square and find the vertex
- Symmetry: $y = (x \pm a)(x \pm b)$
- Symmetry: $y = x^2 \pm bx \pm c$
- Symmetry: $y = ax^2 \pm bx \pm c$
- Roots: $y = x^2 \pm bx \pm c$
- Roots: $y = ax^2 \pm bx \pm c$
- Identify the roots from a graph
- Identify the vertex from a graph
- Solve $x^2 \pm ax \pm b = \pm c$ from a graph

Equation of a circle

- Finding the equation of a circle
- Equation of a tangent to a circle

Ratio and Proportion - GCSE Maths.

Ratios and Fractions

Ratios and fractions

- Using ratio language
- Using the ratio symbol
- Simple ratio problems
- Ratios of the form m : n
- Simplifying ratios
- Simplfying ratios (mixed units)
- Expressing in the form 1:n or n:1
- Ratios of the form 1:n or n:1
- Expressing a ratio as a fraction
- Expressing a fraction as a ratio

Dividing in a given ratio

- Dividing in a given ratio
- Find the total - difference known
- Find the total - one share known
- Find the larger share - smaller known
- Find the smaller share -larger known
- Find the larger share - difference known
- Find the smaller share - difference known

Scale Factors and Proportion

Scale factors - Length

- Using scale factors - simple
- Missing lengths - similar rectangles
- Calculating missing sides in similar shapes
- Enlargement - lengths mixture
- Enlargement - finding the new length
- Enlargement - finding the original length

Direct proportion problems

- Solve problems involving scaling
- Solve problems involving rates
- Direct Proportion problems (£s)
- Direct Proportion problems
- Solving recipe problems
- Solving best buy problems
- UK currency for foreign currency
- Foreign currency to UK currency
- Exchange rates - comparing prices

Inverse Proportion

- Inverse proportion problems
- Inverse proportion: $y \propto k / x$
- Inverse proportion: $y \propto k / x^2$
- Inverse proportion: $y \propto k / \sqrt{x}$

Force Area Pressure

- Pressure Force and Area (1) - pressure
- Pressure , Force and Area (2) - force
- Pressure , Force and Area (3) - area
- Pressure , Force and Area - mixture

Scale Factors - Area

- Enlargement - area - mixture
- Enlargement - finding the new area
- Enlargement - finding the original area

Scale Factors - Area

- Enlargement - finding the new volume
- Enlargement - finding the original volume

Forming and using formulae

- Direct proportion: $y \propto kx$
- Direct proportion: $y \propto kx^2$
- Direct proportion: $y \propto k^3\sqrt{x}$
- Direct proportion: $y \propto kx^3$
- Direct proportion: $y \propto k\sqrt{x}$
- Direct proportion – formula – mixture

Mass Volume Density

- Density mass volume (1) - density
- Density mass volume (2) - mass
- Density mass volume (3) - volume
- Density mass volume - Mixture

Map and scale

- Using scale drawings
- Interpret scale diagrams - model to real
- Interpret scale diagrams - real to model to real
- Interpret maps - map to real
- Interpret maps - real to map

Ratio and Proportion - GCSE Maths.

Similarity and Enlargement

- Calculating missing sides in similar shapes
- Using scale factors - simple
- Enlargement - lengths mixture
- Enlargement - finding the new length
- Enlargement - finding the original length
- Enlargement - mixture - length
- Enlargement - area - mixture
- Enlargement - finding the new area
- Enlargement - finding the original area
- Enlargement - volume - mixture
- Enlargement - finding the new volume
- Enlargement - area mixture
- Enlargement - finding the original volume
- Enlargement - volume mixture
- Englargement - area and volume mixture
- Englargement - mixture

Geometry and Measures

Angles

Angles and polygons

- Calculate missing angles triangles
- Calculate angles in a quadrilateral
- Interior angles - polygons
- Exterior angles - polygons

Angles and parallel lines

- Corresponding angles
- Allied/co-interior angles
- Alternate angles
- Angles and Bearings

Pythagoras and Trigonometry

Pythagoras

- Calculating c in $a^2 + b^2 = c^2$
- Calculating a in $a^2 + b^2 = c^2$
- Calculating b in $a^2 + b^2 = c^2$
- Distance between 2 points
- Calculating any side – calculator
- Calculating any side – exact
- Height of an equilateral triangle
- Height of an isosceles triangle
- Length of a diagonal
- Compass directions and distance
- Pythagoras – mixture

Trigonometry - Sine Rule

- Sine rule - calculating an angle
- Sine rule - calculating sides
- Sine rule - calculating angles and sides

Trigonometry

- Sine ratio - calculating the opposite
- Sine ratio - calculating the hypotenuse
- Sine ratio - calculating the angle
- Sine ratio - calculating angles and sides
- Cosine ratio - calculating the adjacent
- Cosine ratio - calculating the hypotenuse
- Cosine ratio - calculating the angle
- Cosine ratio - calculating angles and sides
- Tangent ratio - calculating the opposite
- Tangent ratio - calculating the adjacent
- Tangent ratio - calculating the angle
- Tangent ratio - calculating angles and sides
- Mixed ratios - calculating angles
- Mixed ratios - calculating angles and sides
- Trigonometry in 3D - Cuboid Problems
- Trigonometry in 3D - Pyramid Problems
- Trigonometry in 3D - mixed Problems

Trigonometry - Cosine Rule

- Cosine rule - calculating angles and sides
- Cosine rule - calculating an angle
- Cosine rule - calculating sides
- Sine and cosine rules calculating sides
- Sine and cosine rules calculating an angle
- Sine and cosine rules mixture

Geometry and Measures

Working with circles

Area and Perimeter of Circles

- Radius and diameter calculations
- Circumference of a circle in terms of π
- Circumference of a circle in terms of π – radius known
- Circumference of a circle in terms of π – diameter known
- Circumference of a circle (1 d.p.)
- Circumference of a circle (1 d.p.) – radius known
- Circumference of a circle (1 d.p.) – diameter known
- Calculate the arc length (1 d.p.)
- Calculate the arc length – in terms of π
- Area of a circle in terms of π
- Area of a circle in terms of π – radius known
- Area of a circle in terms of π – diameter known
- Area of a circle – calculator
- Area of a sector (1 d.p.)
- Area of a sector in terms of π
- Sectors – calculate the radius given the area and angle – exact
- Sectors – calculate the angle given the area and radius – exact
- Sectors – mixture – exact values

Volume and Surface Area (of 3D solids)

- Volume and Surface area
- Volume of a cylinder - radius known - in terms of pi
- Volume of a cylinder -diameter known - in terms of pi
- Volume of a cone -radius and vertical height known
- Volume of a cone -radius and slant height known
- Volume of a cone - mixture
- Volume of a sphere
- Calculate the radius of a sphere given the volume
- Volume of asphere and radius mixture
- Calculate the surface area of a cylinder
- Calculate the curved surface area of a cylinder
- Surface area and radius of a sphere mixture
- Calculate the surface area of a sphere
- Calculate the radius of a sphere given the surface area

Vectors

Column Vectors

- Column vectors - sum and difference
- Column vectors - missing values
- Column vectors mixture

Vector geometry

- Vector geometry

Maps and scale

- Using scale drawings
- Interpret scale diagrams - model to real
- Interpret scale diagrams - real to model to real
- Interpret maps - map to real
- Interpret maps - real to map

Probability and Statistics - GCSE Maths.

Probability and Statistics

Probability

- Calculated expected outcome
- Calculating relative frequency

Sampling (Capture-recapture)

- Estimating the population
- Calculating the sample size
- Calculating the number marked
- Capture - recapture - mixture

Averages

- Calculate the range
- Calculate the mean - from a list
- Mean given - find a missing value
- Calculate the median
- Find the mode

Pie Charts

- Pie Charts - calculating angles