MathsBox

Specification A

QUESTION GENERATOR OVERVIEW

Question structures for Edexcel International GCSE.

Every question structure available for Edexcel International GCSE in the Mathsbox Question Generator, organised by topic so you can find exactly what you need.

- Number
- Geometry
- Equations, formulae and identities
- Sequences, functions and graphs
- Vectors and Transformations Geometry
- Probability
- Statistics

2,260 question structures

194 topics

7 strands

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01 EDEXCEL INTERNATIONAL GCSE Number

46 topics
567 structures

Integers

Types of number · Natural numbers 3

Words to figures up to 1,000,000
Words to figures up to 1 billion in figures
Mixture - Natural numbers

Types of number · Integers, odd and even 6

Identifying Positive Integers
Identifying Negative Integers
Identifying Integers
Listing even numbers
Listing odd numbers
Mixture - Integers, odd and even

Types of number · Factors, multiples and primes 14

Finding factors
Finding common factors
Finding the HCF
Listing multiples - mixture
Finding common multiples
Finding the lowest common multiple
Finding LCM using prime factors
Mixture - Finding LCM or HCF
Listing prime numbers
Product of prime factors (10-100)
Product of prime factors
Product of primes, LCM and HCF
Mixture
Mixture - Factors, multiples and primes

Types of number · Using prime factorisation HIGHER 9

Number of positive factors
Using prime factors
Exponents for a given number of factors
Smallest number with two remainders
Factors that are multiples with a restriction
LCM divided by HCF from prime factors
Smallest number divisible by three numbers
Values of k with a given HCF
Mixture -Using prime factorisation

Inequality symbols and ordering 9

Comparing numbers up to 100,000
Comparing numbers up to 1,000,000
Order numbers up to 10,000,000
Order numbers up to 100,000,000
Comparing directed numbers
Ordering temperatures
Order numbers in standard form
Compare numbers in standard form
Mixture - Inequality symbols/ordering

The four operations · Arithmetic 15

Addition
Subtraction
Inverse operations - addition
Inverse operations - subtraction
Multiply a 3 digit by a 1 digit number
Multiply by 10,100 or 1,000
Multiply - 2 digit by 2 digit
Multiply - 3 digit by 2 digit
Multiply - 4 digit by 2 digit

The four operations · Arithmetic *continued*

Dividing by 10, 100 or 1,000
Division - by multiples of 10, 100, 1,000
Division - 3 or 2 digit by 1 digit
Division - 3 or 4 digit by 2 digit numbers
Use known facts - multiplication
Mixture - Integers - Arithmetic

The four operations · Order of operations 26

Order of operations $a - b + c \times d$
Order of operations $a + b + c \times d$
Order of operations $a + b \times c$
Order of operations $a - b \times c$
Order of operations $a + b \div c$
Order of operations $a - b \div c$
Order of operations $a \times b - c \times d$
Order of operations $a \times b + c \times d$
Order of operations $a + (b + c) \times d$
Order of operations $(a + b) \times c$
Order of operations $(a - b) \times c$
Order of operations $a - (b + c) \times d$
Order of operations $a \times (b - c)$
Order of operations $(a - b) \times c$
Order of operations $(a + b) \div c$
Order of operations $a \div (b + c)$
Order of operations $(a - b) \div c$
Order of operations $a \div (b - c)$
Order of operations $a(b - c) + d$
Order of operations $a(b + c) + d$
Order of operations $a \times (b - c)^2$
Order of operations $(a - b)^2$
Order of operations $(a + b)^2$
Order of operations $a \times (b - c) \times d$
Order of operations mixture
Mixture Integer BIDMAS

Directed numbers · Arithmetic 11

Addition crossing zero
Directed numbers a + -b
Subtraction crossing zero
Directed numbers a - -b
Directed numbers $+$ and $-$
Directed numbers $\pm a \times \pm b$
Directed numbers $\pm a \div \pm b$
Directed numbers $\times$ and $\div$
Directed numbers - Mixed Arithmetic
Missing numbers mixture
Mixture directed no. Arithmetic

Directed numbers · Order of operations 25

Order of operations $a - b + c \times d$
Order of operations $a - (b + c) \times d$
Order of operations $a + b + c \times d$
Order of operations $a + (b + c) \times d$
Order of operations $a \times (b - c)^2$
Order of operations $a - b^2$
Order of operations $a + b^2$
Order of operations $a \times (b - c) \times d$
Order of operations $a \times b - c \times d$
Order of operations $a \times b + c \times d$
Order of operations $(a + b) \times c$
Order of operations $a \times (b - c)$

Directed numbers · Order of operations *continued*

- Order of operations $(a-b)\times c$
- Order of operations $a\div(b+c)$
- Order of operations $a\div(b-c)$
- Order of operations $a+b\times c$
- Order of operations $a-b\times c$
- Order of operations $a+b\div c$
- Order of operations - Mixture
- Order of operations $a\times b+c$
- Order of operations $a+b\times c$
- Order of operations $a\times b-c$
- Order of operations $a-b\times c$
- Order of operations mixture
- Mixture directed no. BIDMAS

Sets and notation

Set notation and Venn diagrams 6

- Intersection of two sets
- Union of two sets
- Union and intersection from inequalities
- Set membership true or false
- Listing from a universal set
- Shaded region in set notation

Set notation and Venn diagrams HIGHER 5

- Three sets of multiples
- Operations on three listed sets
- Three-set shaded region
- Unknown region in a two-set Venn
- Mixture - Sets Venn diagrams (2)

Powers and Roots

Squares, cubes, roots and other powers 10

- Listing square numbers
- Cube numbers
- Finding square and cube numbers
- Cube and square numbers
- Finding square and cube roots
- Finding square, cubes and roots - mixture
- Square roots and intervals
- Power multiplied by a root
- Calculations with indices
- Mixture - Power and roots

Evaluating indices 5

- Positive integer powers (1)
- Positive integer powers (2)
- Negative integer powers
- Negative integer powers and reciprocals
- Mixture - integers indices

Evaluating indices HIGHER 5

- Fractional powers $\frac{1}{2}$ and $\frac{1}{3}$
- Fractional powers $\frac{n}{m}$
- Negative fractional powers $\frac{1}{2}$ and $\frac{1}{3}$
- Negative fractional powers $\frac{n}{m}$
- Mixture fractional - indices

Laws of indices 12

- Multiplying $a^n\times a^m$
- Multiplying $a^n\times a^{-m}$
- Multiplying $a^{-n}\times a^{-m}$
- Multiplying $a^{\frac{m}{n}}\times a^{\frac{p}{q}}$
- Dividing $a^n\div a^m$
- Dividing $a^n\div a^{-m}$
- Dividing $a^{-n}\div a^{-m}$

Laws of indices *continued*

- Dividing $a^{\frac{m}{n}}\div a^{\frac{p}{q}}$
- Power $(a^n)^m$
- Power $(a^{\pm n})^{\pm m}$
- Multiply and dividing (positive integers)
- Mixture - Laws of indices

Surds · Simplifying HIGHER 10

- 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 and multiplying mixture
- Simplifying expressions involving surds
- Mixture - surds - simplifying

Surds · Expanding brackets HIGHER 8

- Expanding brackets :$\sqrt{a}(a\sqrt{b}\pm c)$
- Expanding brackets : $\sqrt{a}(b\pm\sqrt{a})$
- Single bracket mixture
- 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 brackets - Mixture
- Mixture - surds - expanding brackets

Surds · Rationalising the denominator HIGHER 5

- Rationalising the denominator :$\frac{a}{\sqrt{b}}$
- Rationalising the denominator :$\frac{a}{c\pm\sqrt{b}}$
- Rationalising the denominator $\frac{a\pm\sqrt{b}}{c\pm\sqrt{b}}$
- Rationalising the denominator mixture
- Mixture - Rationalising the denominator

Equivalence

Fractions, decimals and percentages 11

- Fraction as decimal
- Decimal as a fraction
- 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
- Fraction as a percentage
- Percentage as a fraction
- Percentage as a fraction (2)
- Ordering mixture
- Mixture - Equivalence

Fractions

Fractions - mixed - improper 4

- Simplifying fractions
- Mixed numbers to improper fractions
- Improper fractions to mixed numbers
- Mixture - Fractions - mixed/improper

Arithmetic 16

- Add any two proper fractions
- Adding mixed numbers
- Subtract fractions
- Fraction from a mixed number
- Subtract mixed numbers
- Multiply - fraction by an integer
- Find the product of a pair of proper fractions

Arithmetic *continued*

- Multiply - mixed number by an integer
- Multiply mixed numbers
- Divide an integer by a fraction
- Dividing a fraction by an integer
- Divide any pair of fractions
- Divide mixed numbers
- Proper fractions - mixed arithmetic
- Mixed Numbers - Mixed arithmetic
- Mixture - Fractions - Arithmetic

Decimals

Recurring decimals HIGHER 14

- Recurring decimals $0.a\dot{b}$
- Recurring decimals $0.\dot{a}\dot{b}$
- Recurring decimals $0.a\dot{b}\dot{c}$
- Recurring decimals as mixed numbers
- Recurring decimals as improper fractions
- Solve x plus a recurring decimal
- Subtract recurring decimals
- Multiply by a recurring decimal
- Divide recurring decimals
- Terminating plus recurring
- Ratio of recurring decimals
- Linear equation with a recurring decimal
- Square of a recurring decimal
- Mixture - Recurring decimals

The four operations · Arithmetic 14

- Add decimals (up to 3 d.p)
- Subtract decimals (up to 3 d.p.)
- Multiplying by 10, 100, 1,000 missing values
- Multiplying a decimal by an integer
- Multiplying by multiples of 10 or decimals
- Multiplying decimals
- Multiplying decimals (written methods)
- Multiplying 2 decimals
- Dividing by powers dividing by 10, 100, 1,000
- Dividing a decimal by an integer
- Division - Integer by a decimal
- Division - by integers or decimal
- Division - Decimal by a decimal
- Mixture Decimals - Arithmetic

The four operations · Order of operations 26

- Order of operations $a - b + c \times d$
- Order of operations $a + b + c \times d$
- Order of operations $a + b \times c$
- Order of operations $a - b \times c$
- Order of operations $a + b \div c$
- Order of operations $a - b \div c$
- Order of operations $a \times b - c \times d$
- Order of operations $a \times b + c \times d$
- Order of operations $a + (b + c) \times d$
- Order of operations $(a + b) \times c$
- Order of operations $(a - b) \times c$
- Order of operations $a - (b + c) \times d$
- Order of operations $a \times (b - c)$
- Order of operations $(a - b) \times c$
- Order of operations $(a + b) \div c$
- Order of operations $a \div (b + c)$
- Order of operations $(a - b) \div c$
- Order of operations $a \div (b - c)$
- Order of operations $a(b - c) + d$
- Order of operations $a(b + c) - d$
- Order of operations $a \times (b - c)^2$
- Order of operations $(a - b)^2$

The four operations · Order of operations *continued*

- Order of operations $(a + b)^2$
- Order of operations $a \times (b - c) \times d$
- Order of operations mixture
- Mixture - decimals - BIDMAS

Standard form

Expressing in standard form 14

- Multiplying positive powers of 10
- Dividing positive powers of 10
- Multiplying and Dividing powers of 10
- Negative powers of 10 as a decimal
- Writing in standard form $0 < n < 1$
- Writing in ordinary form $0 < n < 1$
- Mixture for $0 > n < 1$
- Writing in standard form $n > 1$
- Writing in ordinary form $n > 1$
- Mixture for $n > 1$
- Writing in ordinary form - mixture
- Writing in standard form - mixture
- Writing in standard form
- Mixture Expressing in standard form

Arithmetic 7

- Standard form - addition
- Standard form - subtraction
- Standard form - multiplication
- Standard form - division
- Standard form - $\times$ and $\div$
- Standard form - mixed arithmetic
- Mixture S.F. Arithmetic Calculator

Problem solving HIGHER 13

- How many times heavier
- Time from distance and speed
- Distance from speed and time
- Total after an increase
- Power per square metre
- Total charge of a sample
- How many times greater
- Total volume of droplets
- Increase by a percentage
- Decrease by a percentage
- Percentage increase of two readings
- Volume after evaporation
- Mixture - Problem solving in standard form

Degree of Accuracy

Rounding 21

- Mixed Rounding up to 10,000
- Mixed rounding up to 10,000,000
- Rounding to 1 significant figure (integers)
- Rounding to 1 significant figure (decimals)
- Rounding to 1 significant figure
- Rounding to 2 significant figure (integers)
- Rounding to 2 significant figure (decimals)
- Rounding to 2 significant figures
- Rounding to 1 or 2 significant figures
- Rounding to 3 significant figure (integers)
- Rounding to 3 significant figure (decimals)
- Rounding to 3 significant figures
- Rounding-significant figures (integers)
- Rounding-significant figures (decimals)
- Rounding significant figures - mixture
- Rounding to 1 decimal place
- Rounding to 2 decimal places

Rounding *continued*

- Rounding to 1 or 2 decimal places
- Rounding s.f. or d.p. mixture
- Rounding - Mixture - all
- Mixture - Rounding)

Estimating calculations 17

- Estimation : $\frac{a+b}{c}$
- Estimation : $\frac{a-b}{c}$
- Estimation $\frac{a \times b}{c}$
- Estimation $a \times b$
- Estimation $a + b$
- Estimation $a - b$
- Estimation - Mixture
- Estimation $a \div b$
- Estimation $a \times b \times c$
- Estimation $\frac{a \times b}{c \times d}$
- Estimation $\sqrt{a}$
- Estimation a^2
- Estimation $(a + b) \times c$
- Estimation $\frac{a}{b+c}$
- Estimation $\sqrt{a \times b}$
- Estimation - Mixture of all types
- Mixture -Estimating calculations-

Error intervals 10

- 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 1,000
- Error intervals - mixture
- Error intervals - numbers - nearest integer
- Error intervals - numbers - 1 d.p.
- Error intervals - numbers - 2 d.p.
- Error intervals - mixture

Upper and lower bounds of calculations HIGHER 13

- Lower Bounds for rounded measures
- Upper Bounds for rounded measures
- Min/max radius
- Min/max perimeter
- Min/max containers
- Calculations involving bounds -mixture
- Min/max $\frac{A \times B}{C}$
- Min/max $\frac{A}{B \times C}$
- Min/max $A + B - C$
- Min/max $C(A - B)$
- Min/Max mixture - formula
- Min/Max mixture
- Mixture - bounds of calculations

Ratio and proportion

Simplifying ratios 10

- Using ratio language
- Using the ratio symbol
- Completing equivalent ratios
- Simplifying ratios
- Simplifying ratios (mixed units)
- Expressing in the form 1:n
- Expressing in the form 1:n or n:1
- Expressing a ratio as a fraction
- Expressing a fraction as a ratio
- Mixture - Simplifying ratios

Dividing in a ratio 17

- Dividing in a given ratio (1)

Dividing in a ratio *continued*

- Dividing in a given ratio (1a)
- Dividing in a given ratio (2)
- Dividing in a given ratio (2a)
- Dividing in a given ratio (3)
- Dividing in a given ratio (3a)
- Find the larger share (1)
- Find the larger share (1a)
- Find the smaller share (1)
- Find the smaller share (1a)
- Find the larger share (2)
- Find the larger share (2a)
- Find the smaller share (2)
- Find the smaller share (2a)
- Mixed questions
- Mixed questions (a)
- Mixture - Dividing in a ratio

Combined ratios 6

- a:b and b:c - find a:c
- a:b and b:c - express as a fraction
- a:b and b:c -calculate a quantity
- na =mb and b:c - find a:b:c
- na =mc and b:c - find a:c
- Mixture - Combined ratios

Proportion problems 24

- Solve problems involving scaling
- Solve problems involving rates
- Direct Proportion problems (£s)
- Direct Proportion problems €
- Direct Proportion problems
- Direct Proportion problems €
- Direct Proportion - mixture
- Direct Proportion - mixture €
- Solving recipe problems
- Calculating wages
- Calculating wages €
- Wages and overtime
- Wages and overtime €
- Wages mixture
- Wages mixture €
- Solving best buy problems
- Solving best buy problems €
- UK currency for foreign currency
- Foreign currency to UK currency
- Exchange rates - non calculator
- Exchange rates - comparing prices
- Inverse proportion problems
- Direct and inverse proportion problems
- Mixture - Proportion problems

Percentages

Percentage of a quantity 5

- Percentage of a quantity £
- Percentage of a quantity €
- Percentage > 100% £
- Percentage > 100% €
- Mixture - Percentage of a quantity

Increasing and decreasing by a given percentage 10

- Multipliers for percentage increases
- Multipliers for percentage decreases
- Multipliers mixture
- Increasing by a given percentage £
- Increasing by a given percentage €
- Decreasing by a given percentage £

Increasing and decreasing by a given percentage *continued*

- Decreasing by a given percentage €
- Increasing and decreasing £
- Increasing and decreasing €
- Mixture - Increasing and decreasing

Percentage change 10

- Calculate the percentage increase £
- Calculate the percentage increase €
- Calculate the percentage decrease £
- Calculate the percentage decrease €
- Calculate the percentage change £
- Calculate the percentage change €
- Calculate a percentage change £
- Calculate a percentage change €
- Expressing as a percentage
- Mixture - Percentage change

Reverse percentages HIGHER 7

- Finding the original < 100% £
- Finding the original < 100% €
- Finding the original > 100% £
- Finding the original > 100% €
- Finding the original mixture £
- Finding the original mixture €
- Mixture - reverse percentages

Compound interest and Depreciation 12

- Calculating compound interest £
- Calculating compound interest €
- Stating a formula for % increase
- Stating a formula for % decrease
- Identifying the interest rate
- Identifying the rate of depreciation
- Compound interest - years £
- Compound interest - years €
- Compound interest - total £
- Compound interest - total €
- Calculate depreciation - car £
- Calculate depreciation - car €

Simple interest, profit, hire purchase and tax 17

- Hire Purchase £
- Hire Purchase €
- Simple interest - calculating the total £
- Simple interest - calculating the total €
- Simple interest - calculating the interest £
- Simple interest - calculating the interest €
- Simple interest mixture £
- Simple interest mixture €
- Calculating the price including VAT £
- Calculating the price including VAT €
- Calculating the price before VAT £
- Calculating the price before VAT €
- Working with VAT - mixture £
- Working with VAT - mixture €
- Calculating Income tax £
- Net Pay £
- Mixture - profit, hire purchase and tax

Mixed contexts 10

- Percentage profit on mugs
- Percentage more paid for a car
- Matching holiday discounts
- Sharing money using percentages
- Repeated percentage change of a house
- Percentage increase in savings
- Comparing two bank accounts

Mixed contexts *continued*

- Percentage profit on books
- Profit on loaves of bread
- Mixture - mixed percentage contexts

Growth and decay HIGHER 15

- Formula for percentage growth
- Formula when a quantity doubles
- Formula for percentage decay
- Formula for monthly depreciation
- Formula for monthly depreciation €
- Percentage increase after t years
- Percentage decrease after t years
- Percentage decrease after t years €
- Repeated doubling or tripling
- Years - growing quantity to reach a target
- Years - to fall below target
- Years - to fall below target €
- Two-stage percentage growth
- Different rates
- Different rates €

Using a calculator

Efficient calculator use 43

- Products, sums and differences
- Inverse operations (1)
- Inverse operations (2)
- Expressing a fraction as a decimal
- Finding the reciprocal
- Comparing fractions and decimals
- Simplify a ratio
- Arithemetic with decimals
- Order of operations
- Using a calculator : $a \times \sqrt{b}$
- Using a calculator : $a \times \sqrt{b} + \sqrt{c}$
- Using a calculator $a \times b^2 + \sqrt{b}$
- Using a calculator $a \times b^2 + \sqrt{c \times d}$
- Using a calculator $\sqrt{a} \times b + c \times \sqrt{d}$
- Using a calculator $\sqrt{a \times b^2} + c \times \sqrt{d}$
- Using a calculator $a \times \sqrt{b} - \sqrt{c}$
- Using a calculator $a \times b^2 - \sqrt{c}$
- Using a calculator $a \times b^2 - \sqrt{c \times d}$
- Using a calculator $\sqrt{a \times b} - c \times \sqrt{d}$
- Using a calculator $\sqrt{a \times b^2} - c \times \sqrt{d}$
- Using a calculator $a - \frac{b}{c}$
- Using a calculator $\sqrt{a - b} + c$
- Using a calculator $\sqrt{a^2 - b} - \sqrt{c}$
- Using a calculator $\sqrt[3]{a + \frac{c}{b}}$
- Using a calculator $\sqrt[3]{\frac{a}{b}} + c^3$
- Using a calculator $a^2 + b^3 + c^4$
- Using a calculator $\frac{b}{a} \times 10^3$
- Using a calculator $\frac{a}{b+c}$
- Squares and roots
- Squares and square roots mixture
- Evaluating roots
- Evaluating indices
- Indices and roots
- Indices and directed numbers
- Powers and root mixture
- Directed numbers :$-a \times -b - c$
- Directed numbers : $-a + -b + c$
- Directed numbers $-(a)^2 + -b + c$
- Directed numbers $(-a)^2 + -b + c$
- Directed numbers $(-a)^2 - -b + -c$
- Directed numbers $(-a)^2 - -b - -c$
- Mixture - Directed numbers
- Mixture - Efficient calculator use

Applying number

Money problems in context 11

- Multiplication problems
- Multiplication problems €
- Totals and change
- Totals and change €
- Tickets and change
- Tickets and change €
- Multiply and divide in context
- Multiply and divide in context €
- Problem solving with money

Money problems in context *continued*

- Problem solving with money €
- Mixture - Problems in context

Currency Problems 6

- Convert using a unit exchange rate
- Convert back to the unit currency
- Two-step currency conversion
- Change money and find the amount left
- Change money spend and convert back
- Mixture - Currency Problems

02 EDEXCEL INTERNATIONAL GCSE Geometry

49 topics
502 structures

Measures

Compound Measures · Speed, distance and time 6

- Speed Distance Time - speed
- Speed Distance Time - distance
- Speed Distance Time - time
- Speed Distance Time - Mixture
- Average speed problems
- Mixture - Speed,distance,time

Compound Measures · Speed – Conversions 7

- Converting m/s to km/h
- Converting km/h to m/s
- Converting (1)
- Converting km/h to mph
- Converting mhp to km/h
- Converting (2)
- Mixture - Speed Conversions

Compound Measures · Density 4

- Density mass volume - density
- Density mass volume - mass
- Density mass volume - volume
- Density mass volume - Mixture

Compound Measures · Population density 9

- Population density
- Population
- Population density (rounded)
- % increase in population density
- Comparing density of two areas
- Total population
- Population growth and area change
- Population density - mixture
- Mixture - Population densit)

Time · Conversions 10

- Time from a digital clock
- am and pm when comparing times
- Understanding the order of the months
- Converting : years months days
- Converting : weeks days hours
- Converting hours minutes
- Converting time mixture
- Minutes and seconds as seconds
- Seconds as minutes and seconds
- Mixture - Time conversions

Time · 24 hour clock calculations 10

- Convert 12 hour to 24 hour time
- Convert 24 hour to 12 hour time
- Duration of a journey (24 hour clock)
- Duration overnight (12 hour clock)
- End time after a given number of minutes
- Arrival time in 24 hour format
- Flight duration with a time difference
- Departure time from duration and arrival
- Working hours with a lunch break
- Mixture - 24 hour clock

Scale drawings · Maps and scale 8

- Using scale drawings
- Interpret scale diagrams - model to real
- Interpret scale diagrams - real to model
- Interpret maps - map to real
- Interpret maps - real to map
- Maps - mixed questions
- Mixed questions
- Mixture - Maps and scale

Bearings 7

- Compass directions and right angles
- Bearings - words
- Bearings - from A to B
- Bearings - from B to A
- Bearings - from A to B
- Bearings - from B to A
- Mixture - Bearings

Metric units 11

- Equivalence - m and cm
- Equivalence - m and cm (decimals)
- Equivalence - cm and mm
- Equivalence - cm and mm (decimals)
- Equivalence - length mixture
- Equivalence ml and litres
- Equivalence ml ,cl and litres
- Mixed Equivalence - kg and km
- Mixed Equivalence - ml and mm
- Equivalence - mixed measures
- Equivalence - mixed measures

Metric units HIGHER 7

- Metric units of area - mm^2 and cm^2
- Metric units of area - cm^2 and m^2
- Metric units of area - mixture

Metric units *continued*

- Metric units of volume - mm^3 and cm^3
- Metric units of volume - cm^3 and m^3
- Metric units of volume - mixture
- Mixture - Metric units

Constructions

Constructions 17

- Draw shapes accurately
- Draw shapes accurately
- Triangle SSS
- Perpendicular bisector
- Angle bisector
- Perpendicular from a point to a line
- Net of a cuboid - volume
- Net of a square box - height
- Net of a cuboid - height
- Net of a cylinder - rectangle
- Net of a triangular prism - length
- Net of a cuboid - surface area
- Net of a square box - height from SA
- Net of a cuboid - height from SA
- Net of a cylinder - rectangle from SA
- Net of a triangular prism - length from SA
- Mixture - nets -constructions

Similarity

Similar lengths 9

- Using scale factors - simple
- Missing lengths - similar rectangles (1)
- Missing lengths - similar rectangles (2)
- Calculating missing sides in similar shapes
- Enlargement - lengths mixture
- Enlargement - finding the new length
- Enlargement - finding the original length
- Enlargement - mixture - length
- Mixture - Similar lengths

Area and volume scale factors · (1) HIGHER 10

- Enlargement - area - mixture
- Enlargement - finding the new area
- Enlargement - finding the original area
- Enlargement - area mixture
- Enlargement - finding the new volume
- Enlargement - finding the original volume
- Enlargement - volume mixture
- Enlargement - area and volume mixture
- Enlargement - mixture
- Mixture - Area/volume scale factors

Area and volume scale factors · (2) HIGHER 9

- Surface area from similar volumes
- Surface areas of similar vases
- Length in similar triangles
- Expression linking similar sides
- Volume of the smaller similar vase
- Height ratio of three similar solids
- Volume of a larger similar block
- Radius of the smaller sphere
- Mixture - area and volume scale factors

Symmetry

Line and rotational symmetry · 2D 10

- Reflecting A
- Reflecting B

Line and rotational symmetry · 2D *continued*

- Reflecting C
- Reflecting D
- Rotational symmetry order 2
- Rotational symmetry order 4
- Reflections - x - axis
- Reflections - y - axis
- Reflecting Coordinates
- Mixture - 2D

Line and rotational symmetry · 3D 4

- Planes of symmetry - 3D solids
- Rotational symmetry - 3D solids
- Order of rotational symmetry - 3D shapes
- Mixture - 3D

Angles, lines and triangles

Angle facts 11

- Classifying angles
- Angles clock hands 5 mins intervals
- Angles on a straight line
- Angles on a straight line
- Angles at a point
- Angles at a point
- Vertically Opposite Angles
- Angles Mixture
- Basic facts and triangles mixture
- Basic facts/triangles/parallel lines mixture
- Mixture - Angle facts

Parallel lines 10

- Corresponding angles
- Allied/co-interior angles
- Alternate angles
- Parallel lines Mixture (1)
- Parallel lines (1)
- Parallel lines (2)
- Parallel lines (3)
- Parallel lines (4)
- Parallel lines mixture (2)
- Mixture - Parallel lines

Angles in polygons 5

- Angles in a triangle
- Angles in an isosceles triangle
- Angles in an isosceles triangle
- Angles in a right angled triangle
- Angles triangles - mixture

Polygons

Angles in polygons HIGHER 15

- Calculate missing angles triangles
- Calculate angles in a quadrilateral
- Quadrilateral and triangle - mixture
- Interior angles - polygons
- Interior angles - polygons
- Exterior angles - polygons
- Angles in polygons - with diagrams
- Angles in polygons - mixed questions
- Interior angles in an arithmetic sequence
- Largest angle in a trapezium
- Decreasing arithmetic sequence of angles
- Three regular polygons at a point
- Area of part of a regular octagon
- Isosceles triangle angle
- Mixture - angles in polygons

Circle properties

Semicircle and tangents 8

- Angle in a semicircle
- Angles in the same segment
- Cyclic quadrilateral
- Tangent–radius
- Angle at circumference (centre given)
- Angle at the centre (circumference given)
- Alternate segment theorem
- Mixture - Semicircle and tangents

Further circle theorems HIGHER 8

- Equal chords equidistant from the centre
- Perpendicular bisector of a chord
- Tangents from an external point
- Intersecting chords theorem
- Intersecting secants theorem
- Further circle theorems mixture
- Circle theorems mixture
- Mixture - Further circle theorems

Mensuration of 2D shapes

Perimeter of polygons 12

- Squares - perimeters
- Squares - perimeter - area known
- Squares - side length - perimeter known
- Rectangle - perimeter of a rectangle
- Rectangle - perimeter - area known
- Rectangle - side length - perimeter known
- Rectangle - rectangle - no diagram
- Rectangle - side length
- Perimeter mixture
- Perimeter of regular polygons
- Side length - perimeter known
- Mixture - Perimeter Calculator

Area of polygons 23

- Squares - area
- Squares - the side length - area known
- Squares - calculate the area - perimeter known
- Rectangle - area
- Rectangle - calculate the side length
- Rectangle - calculate the area - perimeter known
- Rectangle - calculate the perimeter - area known
- Right angled triangle - area
- Right angled triangle - base area known
- Right angled triangle - height area known
- Non right-angled triangle - area
- Non right-angled triangle - base
- Non right-angled triangle - height
- Obtuse-angled triangle area
- Obtuse-angled triangle - base
- Obtuse-angled triangle - height
- Parallelogram - area
- Parallelogram - base - area known
- Parallelogram - height - area known
- Trapezium - area
- Trapezium - base - area known
- Trapezium - height - area known
- Mixture - Area (3)

Circumference and arcs 27

- Circles - circumference - radius known
- Circles - circumference - diameter known
- Circles - circumference - mixture
- Semi-circle - perimeter
- Sector - arc length

Circumference and arcs *continued*

- Sector - radius - arc length known
- Sector - angle - arc length known
- Sector - mixture
- Circles - circumference - radius known
- Circles - circumference - diameter known
- Circles - circumference - mixture
- Sector - arc length
- Circle - circumference - radius known
- Circle - circumference - diameter known
- Circle - circumference - mixture
- Semi-circle - perimeter
- Sectors - arc length
- Sector - radius - arc length known
- Sectors - angle - arc length known
- Sectors - radius
- Sectors - mixtures
- Area and circumference of circle - mixture
- Circle - circumference - radius known
- Circle - circumference - diameter known
- Circle - circumference - mixture
- Sectors - arc length
- Mixture - Circumference and arcs

Area of circles and sectors · Circles 6

- Area of a circle - radius known
- Area of a circle - diameter known
- Area of a circle - mixture
- Area of a semi-circle
- Area of a circle - radius known
- Area of a circle - diameter known

Area of circles and sectors · Sectors 7

- Area of a sector
- Radius of a sector - area known
- Angle of a sectors - area known
- Area of a sector - calc
- Area of a sector - radius
- Area of a sector - angle
- Area of a sector - mixture

Area of circles and sectors · Shaded areas 9

- Shaded Area 1
- Shaded Area 2
- Shaded Area 3
- Shaded Area 4
- Shaded Area 5
- Shaded Area 6
- Area and circumference of circle - non- calc
- Area and circumference of circles - calc
- Mixture - Area - circles/sectors

Area of a segment HIGHER 9

- Segment area from radius and angle
- Major segment (unshaded)
- Radius from a shaded segment
- Perimeter of a shaded segment
- Perimeter of a shaded ring sector
- Perimeter of a major sector
- Perimeter of sector AOC
- Sector area twice a circle
- Mixture - Area of a segment

Compound shapes 8

- Compound shapes - missing length
- Compound shapes - area - 1 missing length
- Compound shapes - area - 2 missing lengths
- Compound shapes - area - mixture
- Compound shapes - missing length

Compound shapes *continued*

- Compound shapes - area
- Compound shapes - Area
- Mixture - Area (3)

3D shapes and volume

Volume · Polyhedra 12

- Cuboid - volume
- Cuboid - missing lengths
- Triangular prism - volume
- Triangular prism - missing lengths
- Triangular prism - missing lengths
- Triangular prism - volume
- Trapezoid prism -volume
- Prisms - volume - mixture
- Square based pyramid - volume
- Square based pyramid - height
- Square based pyramid - base length
- Mixture - Volume (1)

Volume · Cylinders, cones and spheres 22

- Cylinder - volume - radius known
- Cylinder - volume - diameter known
- Cylinder - radius - volume known
- Cylinder - height - volume
- Cone - volume - height known
- Cone - volume - slant height known
- Cone - radius - volume known
- Cone - height - volume known
- Sphere - volume - diameter known
- Sphere - radius - volume known
- Sphere - diameter - volume known
- Cuboid - volume
- Cylinder - volume - diameter known
- Cylinder - volume - radius known
- Cylinder - volume - diameter known
- Cylinder - mixture
- Cones - volume - radius and slant height known
- Cone - volume - mixture
- Sphere - volume
- Sphere - volume - radius
- Sphere - mixture
- Mixture - Volume (2)

Surface area · Polyhedra 7

- Surface Area - Cuboid
- Cuboid
- Surface Area - Triangular prism
- Triangular prism
- Surface Area - Trapezoid prism
- Surface Area - Prisms mixture
- Mixture - Surface area (1)

Surface area · Cylinders, cones and spheres 19

- Curved SA - cylinder - radius
- Curved SA - cylinder - diameter
- Total SA - cylinder - radius
- Total SA - cylinder - diameter
- Cone - height known
- Cone - slant height known
- Sphere - radius known
- Sphere - diameter known
- Sphere - find radius
- Sphere - find diameter
- Cylinder - radius known
- Cylinder - diameter known
- Cylinder - surface area - non calculator
- Cylinder Curved surface area - radius known

Surface area · Cylinders, cones and spheres *continued*

- Cylinder Curved surface area - diameter known
- Sphere
- Find the radius of a sphere
- Sphere mixture
- Mixture - - Surface area (2)

Hemispheres 9

- Hemisphere - volume - radius known
- Hemisphere - volume - diameter known
- Hemisphere - radius - volume known
- Hemisphere - diameter - volume known
- Hemisphere - radius known
- Hemisphere - diameter known
- Hemisphere - find radius
- Hemisphere - find diameter
- Mixture - Hemispheres

Compound shapes · Volume 7

- Cylinder and hemisphere - volume
- Cuboid with cylindrical hole - volume
- Cylinder and cone - volume
- Frustum - volume
- Spherical bowl - volume of water
- Cube with hemisphere removed - volume
- Mixture - Volume(3)

Compound shapes · Surface area 7

- Cylinder and hemisphere - curved surface area
- Cuboid with cylindrical hole - surface area
- Cylinder and cone - curved surface area
- Frustum - total surface area
- Spherical bowl - surface area of water
- Cube with hemisphere removed
- Mixture - Surface area (3)

Trigonometry and Pythagoras' theorem

Pythagoras' theorem · With Diagrams 12

- Pythagoras - hypotenuse
- Pythagoras - shorter side
- Pythagoras - any side
- Pythagoras - any side - non calculate
- Height - equilateral triangle
- Slant height - isosceles triangle
- Height - isosceles triangle
- Perimeter - isosceles triangle
- Area - isosceles triangle
- Length of a diagonal
- Distance between 2 points
- Mixture - Pythagoras (1)

Pythagoras' theorem · No diagrams 7

- Calculating c in $a^2 + b^2 = c^2$
- Calculating a in $a^2 + b^2 = c^2$
- Calculating b in $a^2 + b^2 = c^2$
- Compass directions and distance
- Calculating any side - exact
- Distance between 2 points
- Mixture - Pythagoras (2)

Trigonometry – Identifying sides and ratios 13

- Identifying the sine ratio of an angle
- Identifying the sine ratio of an angle
- Identifying the sine ratio mix
- Identifying the cosine ratio of an angle
- Identifying the cosine ratio of an angle
- Identifying the cosine ratio mix

Trigonometry – Identifying sides and ratios *continued*

- Identifying the tangent ratio of an angle
- Identifying the tangent ratio of an angle
- Identifying the tangent ratio mix
- Identifying mixed ratios of angles
- Identifying mixed ratios of angles
- Identifying mixed ratios of angles mix
- Mixture - Identifying ratios

Trigonometry – using basic ratios · Sine ratio 16

- Sine ratio - calculating the opposite (1)
- Sine ratio - calculating the opposite (2)
- Sine ratio - calculating the opposite mix
- Sine ratio - calculating the hypotenuse (1)
- Sine ratio - calculating the hypotenuse (2)
- Sine ratio - calculating the hypotenuse mix
- Sine ratio - calculating sides (1)
- Sine ratio - calculating sides (2)
- Sine ratio - calculating sides mix
- Sine ratio - calculating the angle (1)
- Sine ratio - calculating the angle (2)
- Sine ratio - calculating the angle mix
- Sine ratio - calculating angles/sides (1)
- Sine ratio - calculating angles/sides (2)
- Sine ratio - calculating angles/sides mix
- Mixture - sine ratio

Trigonometry – using basic ratios · Cosine ratio 16

- Cosine ratio - calculating the adjacent (1)
- Cosine ratio - calculating the adjacent (2)
- Cosine ratio - calculating the adjacent mix
- Cosine ratio - calculating the hypotenuse (1)
- Cosine ratio - calculating the hypotenuse (2)
- Cosine ratio - calculating the hypotenuse mix
- Cosine ratio - calculating sides (1)
- Cosine ratio - calculating sides (2)
- Cosine ratio - calculating sides mix
- Cosine ratio - calculating the angle (1)
- Cosine ratio - calculating the angle (2)
- Cosine ratio - calculating the angle mix
- Cosine ratio - calculating angles/sides (1)
- Cosine ratio - calculating angles/sides (2)
- Cosine ratio - calculating angles/sides mix
- Mixture - cosine ratio

Trigonometry – using basic ratios · Tangent ratio 19

- Tangent ratio - calculating the opposite (1)
- Tangent ratio - calculating the opposite (2)
- Tangent ratio - calculating the opposite mix
- Tangent ratio - calculating the adjacent (1)
- Tangent ratio - calculating the adjacent (2)
- Tangent ratio - calculating the adjacent mix
- Tangent ratio - calculating sides (1)
- Tangent ratio - calculating sides (2)
- Tangent ratio - calculating sides mix
- Tangent ratio - calculating the angle (1)
- Tangent ratio - calculating the angle (2)
- Tangent ratio - calculating the angle mix
- Tangent ratio - calculating angles/sides (1)
- Tangent ratio - calculating angles/sides (2)

Trigonometry – using basic ratios · Tangent ratio *continued*

- Tangent ratio - calculating angles/sides mix
- Mixed ratios - calculating angles (1)
- Mixed ratios - calculating sides (2)
- Mixed ratios - calculating angles/sides mix
- Mixture - tangent ratio

Trigonometry – Angles of depression and elevation HIGHER 11

- Angle of elevation to a building
- Angle of depression from a cliff
- Two angles of elevation - tower
- Angle of elevation to a balloon
- Angle of elevation from a boat
- Two angles of elevation - tree
- Angle of depression to a car
- Flagpole on a platform
- Two-level observation deck
- Angles of elevation and depression - mixture
- Mixture - depression / elevation

Sine rule HIGHER 8

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

Cosine rules HIGHER 4

- Cosine rule - calculating an angle
- Cosine rule - calculating sides
- Cosine rule - calculating angles and sides
- Mixture - Cosine rules

Sine and Cosine rules HIGHER 4

- Sine and cosine rules calculating sides
- Sine and cosine rules calculating an angle
- Sine and cosine rules mixture
- Mixture - Sine/Cosine

Area of a triangle HIGHER 7

- Calculating the area
- Calculating the area
- Calculating the area mixture
- Calculating an angle
- Calculating a side
- Side and angle mixture
- Mixture - Area of a triangle

3D Pythagoras and trigonometry HIGHER 6

- Space diagonal of a cuboid
- Pyramid slant height
- Trigonometry in 3D - Cuboid Problems
- Trigonometry in 3D - Pyramid Problems
- Trigonometry in 3D - mixed Problems
- Mixture - 3D Pythagoras and trigonometry

Algebraic manipulation

Notation and collecting like terms 20

Simple expressions
Collecting like terms-addition
Collecting like terms - Single variable
Collecting like terms $ax + b + cx + d$
Collecting like terms $ax + b + cx - d$
Collecting like terms $ax + b - cx + d$
Collecting like terms $ax - b + cx + d$
Collecting like terms $ax + b - cx - d$
Collecting like terms $ax - b + cx + d$
Collecting like terms $ax - b - cx + d$
Collecting like terms $ax - b - cx - d$
Collecting like terms - mixture
Collecting like terms - Two variables
Collecting like powers of a variable
Multiplying terms $x \times a$
Multiplying terms $a \times x \times b \times x$
Multiplying terms $ax \times bx$
Dividing terms $x \div a$
Dividing terms $ax \div b$
Mixture - Notation and like terms

Expanding single brackets 37

Expanding : $a(bx + c)$
Expanding : $a(bx - c)$
Expanding $a(b - cx)$
Expanding mixture
Expanding $ax(bx + c)$
Expanding $ax(bx - c)$
Expanding $ax(b - cx)$
Expanding mixture
Expanding $a(bx + c) + d$
Expanding $a(bx + c) - d$
Expanding $a(bx + c) + dx$
Expanding $a(bx + c) - dx$
Expanding $a(bx - c) + d$
Expanding $a(bx - c) - d$
Expanding $a(bx - c) + dx$
Expanding $a(bx - c) - dx$
Expanding $a + b(cx + d)$
Expanding $a + b(cx - d)$
Expanding $ax + b(cx + d)$
Expanding $ax + b(cx - d)$
Expanding $a - b(cx + d)$
Expanding $a - b(cx - d)$
Expanding $ax - b(cx + d)$
Expanding $ax - b(cx - d)$
Single brackets - expanding and factorising
Expanding : $a(bx + c) + d(ex + f)$
Expanding : $a(bx - c) + d(ex + f)$
Expanding $a(bx + c) + d(ex - f)$
Expanding $a(bx - c) + d(ex - f)$
Expanding Mixture (1)
Expanding $a(bx + c) - d(ex + f)$
Expanding $a(bx - c) - d(ex + f)$
Expanding $a(bx + c) - d(ex - f)$
Expanding $a(bx - c) - d(ex - f)$
Expanding Mixture (2)
Expanding Mixture (3)
Mixture - Expanding single brackets

Expanding two and three brackets 21

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 $(x \pm a)^2$
Expanding $(x - a)(x + a)$
Expanding Mixture - double brackets
Expanding $(x^2 \pm a)(x \pm b)$
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 $(ax - b)^2$
Expanding Mixture (1)
Expanding Mixture (2)
Expanding 3 brackets
Expanding $(x \pm a)(x \pm b)^2$
Mixture - Expanding 2 or 3 brackets

Factorising - single brackets 11

Factorising : $ax + b$
Factorising : $ax - b$
Factorising $a - bx$
Factorising Mixture (1)
Factorising $ax^2 + bx$
Factorising $ax^2 - bx$
Factorising $bx - ax^2$
Factorising Mixture (2)
Factorising Mixture (3)
Factorising : $ax \pm bx \pm kay \pm kby$
Mixture - Factorising — common factors

Factorising quadratics HIGHER 17

Factorising : $x^2 + bx + c$
Factorising : $x^2 \pm bx - c$
Factorising $x^2 - bx + c$
Factorising $x^2 \pm 2ax + a^2$
Factorising Mixture - double brackets
Factorising : $x^2 - b^2$
Factorising : $a^2x^2 - b^2$
Factorising Difference of 2 squares
Factorising $ax^2 + bx + c$
Factorising $ax^2 \pm bx - c$
Factorising $ax^2 - bx + c$
Factorising to $(ax + b)^2$
Factorising to $(ax - b)^2$
Factorising Mixture (1)
Factorising Mixture (2)
Factorising : $ax^3 \pm bx^2 \pm c$
Mixture - Factorising quadratics

Completing the square HIGHER 4

Expressing in the form : $(x \pm a)^2 \pm b$
Expressing in the form : $(ax \pm b)^2 \pm c$
Completed square form mixture
Mixture - Completing the square

Algebraic fractions · Simplifying (1) HIGHER 16

Express as a single fraction : $\frac{x}{a}+\frac{x}{b}$
Express as a single fraction : $\frac{x}{a}-\frac{x}{b}$
Express as a single fraction $\frac{ax}{b}+\frac{cx}{d}$
Express as a single fraction $\frac{ax}{b}-\frac{cx}{d}$
Express as a single fraction $\frac{x+a}{b}+\frac{x+c}{d}$
Express as a single fraction $\frac{x+a}{b}-\frac{x+c}{d}$
Express as a single fraction $\frac{x+a}{b}-\frac{x-c}{d}$
Express as a single fraction $\frac{x-a}{b}-\frac{x+c}{d}$
Express as a single fraction $\frac{x-a}{b}-\frac{x-c}{d}$
Express as a single fraction $\frac{x-a}{b}+\frac{x-c}{d}$
Express as a single fraction $\frac{x+a}{b}-\frac{x-c}{d}$
Express as a single fraction mixture
Multiply algebraic fractions
Divide algebraic fractions
Rational expressions
Mixture - algebraic fractions

Algebraic fractions · Simplifying (2) HIGHER 10

Difference divided by a fraction
Product then subtract a bracket
Product then add a bracket
Fraction multiplied by a difference
Product then subtract a fraction
Number minus a quotient
Show the result is $\frac{a}{x+b}$
Substitute $k=x-y$
Express a in terms of y
Mixture - algebraic fractions

Expressions and formulae

Substitution · Positive integers 39

Substitution : $x+a$
Substitution : $x-a$
Substitution ax
Substitution $\frac{a}{x}$
Substitution Mixture
Substitution $y=ax+b$
Substitution $y=ax-b$
Substitution $y=b-ax$
Substitution $y=\frac{x}{a}+b$
Substitution $y=\frac{x+a}{b}$
Substitution $y=\frac{x-a}{b}$
Substitution $y=\frac{ax+b}{c}$
Substitution $y=\frac{ax-b}{c}$
Substitution Mixture - linear
Substitution $y=ax^2$
Substitution $y=x^2\pm b$
Substitution $y=ax^2+b$
Substitution $y=ax^2-b$
Substitution $y=b-ax^2$
Substitution $y=(ax)^2+b$
Substitution $y=\frac{ax^2}{b}$
Substitution $y=\frac{ax^2}{b}+c$
Substitution $y=\frac{ax^2}{b}-c$
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 Mixture - quadratic
Substitution $y=\sqrt{b-ax}$
Substitution $y=a\sqrt{x}+b$
Substitution $y=b-a\sqrt{x}$
Substitution $y=\sqrt{\frac{x+a}{b}}$

Substitution · Positive integers *continued*

Substitution $y=\sqrt{\frac{x-a}{b}}$
Substitution $y=\sqrt{b(ax+c)}$
Substitution $y=\frac{a}{\sqrt{x+b}}$
Substitution $y=ax^3\pm bx^2\pm cx\pm d$
Mixture - substitution - Positive integers

Substitution · Directed Numbers 41

Substitution $y=x+a$
Substitution $y=x-a$
Substitution $y=a-x$
Substitution $y=ax$
Substitution $y=\frac{x}{a}$
Substitution $y=\frac{a}{x}$
Substitution $y=ax+b$
Substitution $y=ax-b$
Substitution $y=b-ax$
Substitution $y=\frac{x}{a}+b$
Substitution $y=\frac{x+a}{b}$
Substitution $y=\frac{x-a}{b}$
Substitution $y=\frac{ax+b}{c}$
Substitution $y=\frac{ax-b}{c}$
Substitution $y=x^2\pm b$
Substitution $y=ax^2+b$
Substitution $y=ax^2-b$
Substitution $y=b-ax^2$
Substitution $y=(ax)^2+b$
Substitution $y=\frac{ax^2}{b}$
Substitution $y=\frac{ax^2}{b}+c$
Substitution $y=\frac{ax^2}{b}-c$
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 $y=x^2\pm bx\pm c$
Substitution $y=bx-ax^2\pm c$
Substitution Quadratic Mixture
Linear / Quadratic Mixture
Substitution $y=\sqrt{ax+b}$
Substitution $y=\sqrt{b-ax}$
Substitution $y=\sqrt{\frac{x+a}{b}}$
Substitution $y=\sqrt{b(x-a)}$
Substitution $y=\frac{a}{\sqrt{x+b}}$
Substitution $y=ax^3\pm bx^2$
Substitution $y=ax^3\pm bx^2\pm cx\pm d$
Substitution one-step mixture + -
Substitution mixture inc quadratic + -
Substitution cubic formula + -
Mixture - substitution directed Numbers

Substitution · Fractions 8

Substitution $y=ax+b$
Substitution $y=b-ax$
Substitution $y=a(x\pm b)$
Substitution $y=ax^2\pm b$
Substitution $y=ax^2\pm bx$
Fractions mixture
Substitution fractional and negative values
Mixture - substitution Fractions

Changing the subject (1) · One step 7

Change the subject - $y=x+a$
Change the subject - $y=x-a$
Change the subject - $y=ax$
Change the subject - $y=\frac{a}{x}$
Change the subject - $y=\frac{x}{a}$
Change the subject - $y=a-x$

Changing the subject (1) · One step *continued*

Change the subject - mixture

Changing the subject (1) · Two step 8

Rearrange : $y = ax + b$
Rearrange : $y = ax - b$
Rearrange : $y = b - ax$
Rearrange : $y = \frac{x}{a} + b$
Rearrange : $y = \frac{x}{a} - b$
Rearrange : $y = \frac{x+a}{b}$
Rearrange : $y = \frac{x-a}{b}$
Rearrange : mixture

Changing the subject (1) · Powers and roots HIGHER 12

Rearrange complex : - $y = \sqrt{x+a}$
Rearrange complex : $y = \sqrt{x-a}$
Rearrange complex : $y = \sqrt{a-x}$
Rearrange complex : $y = \frac{\sqrt{x}}{a}$
Rearrange complex : $y = \frac{a}{\sqrt{x}}$
Rearrange complex : $y = \sqrt{\frac{a}{x}}$
Rearrange complex : $y = \sqrt{\frac{x}{a}}$
Rearrange complex : $y = \sqrt{x} + a$
Rearrange complex : $y = \sqrt{x} - a$
Rearrange complex : $y = -\sqrt{x}$
Rearrange complex formula :mixture (1)
Rearrange complex formula :mixture (2)

Changing the subject (2) · Subject appears twice HIGHER 16

Subject appears twice $ax = bx + c$
Subject appears twice $ax = c - bx$
Subject appears twice $ax + b = cx + d$
Subject appears twice $ax - b = cx + d$
Subject appears twice $ax - b = d - cx$
Subject appears twice $ax + b = d - cx$
Subject appears twice $\frac{x+a}{x+b} = c$
Subject appears twice $\frac{x-a}{x+b} = c$
Subject appears twice $\frac{x+a}{x-b} = c$
Subject appears twice $\frac{x-a}{x-b} = c$
Subject appears twice $\frac{x}{x-b} = c$
Subject appears twice $\frac{x}{x+b} = c$
Subject appears twice $\frac{ax+b}{cx+d} = e$
Subject appears twice $\frac{ax-b}{cx+d} = e$
Subject appears twice $\frac{ax-b}{cx-d} = e$
Subject appears twice - mixture

Use of symbols

Simplifying algebraic indices 13

Simplify $a \times a \times a \times a$
Simplify $a^3 \times a \times a^4$
Multiplying terms $ax^m \times bx^n$
Dividing terms $a^n \div a^m$
Dividing terms $ax^n y^m \div cx$
Simplifying $(ax^n)^m$
Simplifying $(a^m b^n c^p)^q$
Simplifying $(ax^2 \times bx^4 \times cx$
Indices - Addition law - missing power
Indices - Subtraction law - missing power
Indices - raising to a power - missing power
Missing powers - mixture
Mixture - Simplifying indices

Equations with indices 8

Solving $\boxed{?}^{\frac{n}{2}} = \frac{1}{m}$
Solving $\boxed{?}^{\frac{n}{2}} = m$

Equations with indices *continued*

Solving $\boxed{?}^{\frac{n}{3}} = \frac{1}{m}$
Solving $\boxed{?}^{\frac{n}{2}} = m$
Solving $\boxed{?}^{-\frac{n}{2}} = m$
Solving $\boxed{?}^{-\frac{n}{3}} = m$
Solving $a^m \times b^{\boxed{?}} = m$
Mixture - Equations with indices

Linear Equations

Forming equations 7

Forming single step expressions
Forming equations 1 step
Forming equations 2 step
Forming and solving equations
Find an expression for the output
Find the function
Mixture - Forming equations

One and two step 15

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 $\frac{x}{a} = b$
One step equations Mixture
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
Negative Mixture
Mixture - equations 1 and 2 step

Brackets 13

Solving $a(bx + c) = d$
Solving $a(bx - c) = d$
Solving $a(c - bx) = d$
Solving Mixture (1)
Solving Mixture (2)
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
Mixture - equations - Brackets

Unknown on both sides 20

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 mixture
Both sides $a(bx + c) = dx + e$
Both sides $a(bx - c) = dx + e$

Unknown on both sides *continued*

Both sides $a(bx+c)=dx-e$
Both sides $a(bx-c)=dx-e$
Both sides $a(c-bx)=dx+e$
Both sides $a(c-bx)=dx-e$
Mixture - Unknown on both sides

Fractional Equations · One sided linear 8

Equations with fractions $\frac{x}{a}-b=c$
Equations with fractions $\frac{x}{a}+b=c$
Equations with fractions $\frac{x+a}{b}=c$
Equations with fractions $\frac{x-a}{b}=c$
Equations with fractions $a-\frac{x}{b}=c$
Equations with fractions $\frac{x-a}{b}=x\pm c$
Equations with fractions mixture
Mixture - equations - fractions

Fractional Equations · Unknown on both sides 21

Equations with fractions $\frac{x}{a}+b=cx+d$
Equations with fractions $\frac{x}{a}-b=cx+d$
Equations with fractions $\frac{x}{a}+b=cx-d$
Equations with fractions $\frac{x}{a}-b=cx-d$
Equations with fractions $b-\frac{x}{a}=cx+d$
Equations with fractions $b-\frac{x}{a}=cx+d$
Equations with fractions $\frac{x}{a}+b=\frac{x}{c}+d$
Equations with fractions $\frac{x}{a}-b=\frac{x}{c}+d$
Equations with fractions $\frac{x}{a}+b=\frac{x}{c}-d$
Equations with fractions $\frac{x}{a}-b=\frac{x}{c}-d$
Equations with fractions $\frac{x}{a}+b=d-\frac{x}{c}$
Equations with fractions $\frac{x}{a}-b=d-\frac{x}{c}$
Equations with fractions $\frac{x}{a}+\frac{x}{b}=c$
Equations with fractions $\frac{x}{a}-\frac{x}{b}=c$
Equations with fractions $\frac{x}{a}+\frac{x}{b}=cx+d$
Equations with fractions $\frac{x}{a}-\frac{x}{b}=cx+d$
Equations with fractions $\frac{x}{a}+\frac{x}{b}=cx-d$
Equations with fractions $\frac{x}{a}-\frac{x}{b}=cx-d$
Equations with fractions $\frac{x}{a}+\frac{x}{b}=e-dx$
Equations with fractions $\frac{x}{a}-\frac{x}{b}=e-dx$
Mixture - equations - fractions

Quadratic Equations

Fractions – leading to quadratic equations HIGHER 9

Equation - fractions $\frac{a}{x}+\frac{b}{x+c}=d$
Equation - fractions $\frac{a}{x}-\frac{b}{x+c}=d$
Equation - fractions $\frac{a}{x}+\frac{b}{x-c}=d$
Equation - fractions $\frac{a}{x-c}-\frac{b}{x}=d$
Equation - fractions $\frac{a}{x+b}+\frac{b}{x+d}=e$
Equation - fractions $\frac{a}{x+b}-\frac{b}{x+d}=e$
Equation - fractions $\frac{a}{x-b}-\frac{c}{x+d}=e$
Equation - fractions $\frac{a}{x-b}-\frac{c}{x-d}=e$
Mixture - Quadratic - calculator

Single bracket HIGHER 5

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
Mixture - solving - Single bracket

Double Bracket HIGHER 16

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 $x^2\pm 2ax+a^2=0$
Factorise and solve mixture (8 - 11)
Factorise and solve $x^2-b^2=0$

Double Bracket *continued*

Factorise and solve $a^2x^2-b^2=0$
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 (13-18)
Factorise and solve mixture (8 - 19)
Rearrange and solve
Rearrange and solve
Mixture - solving double brackets

Quadratic equations · Completing the square HIGHER 3

Solve $x^2\pm bx\pm c=0$
Solve $ax^2\pm bx\pm c=0$
Mixture - Completing the square

Using the formula HIGHER 4

Find the discriminant
Solve $x\pm bx\pm c=0$
Solve $ax\pm bx\pm c=0$
Mixture - Using the formula

Form and solve HIGHER 10

Rectangle area
Ball height
Profit
Numbers differing by 1
Square and rectangle
Journey time
Circle areas
Quadratic sequence
Triangle area
Mixture - Form and solve

Simultaneous Equations

Forming equations 5

Forming equations - tickets
Forming equations - pens and pencils
Forming equations - two numbers
Forming simultaneous equations - rectangle
Mixture - Forming simultaneous equations

Solving (1) · Linear equations 18

Finding pairs of values
Solve problems with two unknowns
$x-by=r$ and $cx+dy=s$
$x+by=r$ and $cx-dy=s$
$x-by=r$ and $cx-dy=s$
$ax+y=r$ and $cx+dy=s$
$ax-y=r$ and $cx+dy=s$
$ax+y=r$ and $cx-dy=s$
$ax-y=r$ and $cx-dy=s$
Mixture - simultaneous equations (1)
$ax+by=r$ and $ax-y=s$
$ax+by=r$ and $ax+y=s$
$ax-by=r$ and $ax-y=s$
$ax+by=r$ and $x-by=s$
$ax-by=r$ and $x-by=s$
$ax+by=r$ and $x+by=s$
Simultaneous Equations Mixture (2)
Mixture - Simultaneous Equations

Solving (2) HIGHER 9

$x+y=s$ and $xy=p$
$ax+y=c$ and $x^2+by=d$

Solving (2) *continued*

$y = mx$ and $y = x^2 \pm c$
$y = x \pm a$ and $y = x^2 \pm b$
$x^2 + y^2 = r^2$ and $y = x \pm c$
$x^2 + y^2 = r^2$ and $y = ax \pm c$
$x^2 \pm axy^2 \pm by = c$ and $x + y = d$
$ax^2 \pm by^2 = c$ and $x + y = d$
Mixture - non-linear simultaneous

Inequalities

Linear inequalities · Listing and defining solutions 10

Inequalities : $a < x < b$
Inequalities : $a \leq x < b$
Inequalities $a < x \leq b$
Inequalities $a \leq x \leq b$
Inequalities mix
Inequality from a number line $a < x < b$
Inequality from a number line $a \leq x < b$
Inequality from a number line $a < x \leq b$
Inequality from a number line $a \leq x \leq b$
Mixture - Listing and defining

Linear inequalities · Finding smallest or largest integer 6

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
Mixture - smallest/largest integer

Linear inequalities · Solving - unknown on one side 20

Solving : $x + a <> b$
Solving : $x - a <> b$
Solving $x \pm a <> b$
Solving $ax + b <> c$
Solving $ax - b <> c$
Solving $ax \pm b <> c$
Solving $\frac{x}{a} - b <> c$
Solving $\frac{x}{a} + b <> c$
Solving $\frac{x+a}{b} <> c$
Solving $\frac{x-a}{b} <> c$
Solving $a(bx + c) <> d$
Solving $a(bx - c) <> d$
Solving $a(bx \pm c) <> d$
Mixture (1)
Solving $a(b - cx) <> d$
Solving $a - \frac{x}{a} <> d$
Solving $\frac{a-x}{b} <> d$
Solving mixture (2)
Solving mixture (3)
Mixture - unknown on one side

Linear inequalities · Solving - unknown on both sides 15

Solving $ax + b < cx + d$
Solving $ax - b < cx + d$
Solving $ax + b < cx - d$
Solving $ax - b < cx - d$
Solving $ax + b < d - cx$
Solving $ax - b < d - cx$
Solving Mixture (4)
Solving Mixture (5 inc negative solutions)
Solving $a < bx + c < d$
Solving $a < bx - c < d$
Solving $a < b - cx < d$
Solving Mixture (6)
Equations and inequalities mixture

Linear inequalities · Solving - unknown on both sides *continued*

Equations and inequalities mixture
Mixture - unknown on both sides

Quadratic inequalities · Solving - solutions as inequalities 9

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 Inequalites - Mixture

Quadratic inequalities · Representing on a number line 9

Represent $x^2 - bx + c \geq 0$ or > 0
Represent $x^2 - bx + c \leq 0$ or < 0
Represent $x^2 - bx - c \geq 0$ or > 0
Represent $x^2 - bx - c \leq 0$ or < 0
Represent $x^2 + bx - c \geq 0$ or > 0
Represent $x^2 + bx - c \leq 0$ or < 0
Represent $x^2 + bx + c \geq 0$ or > 0
Represent $x^2 + bx + c \leq 0$ or < 0
Mixture - Representing on a number line

Inequalities in two variables · Defining inequalities for regions HIGHER 15

Representing $y \geq a$ or $y > a$
Representing $y \leq a$ or $y < a$
Representing $x \geq a$ or $x > a$
Representing $x \leq a$ or $x < a$
Representing $ax + by \geq c$
Representing $ax + by \leq c$
Representing $ax + by \geq c$ and axes
Representing $ax + by \leq c$ and axes
Representing $ax + by \geq c, x \leq p, y \leq 0$
Representing $ax + by \leq c, x \geq p, y \geq 0$
Representing $ax + by \geq c, x \leq 0, y \leq p$
Representing $ax + by \leq c, x \geq 0, y \geq p$
Representing $ax + by \leq c, x \geq p, y \geq q$
Representing $ax + by \geq c, x \leq p, y \leq q$
Mixture - Defining inequalities

Proportion

Direct and inverse proportion formulae HIGHER 20

Direct proportion : $y \propto kx$
Direct proportion : $y \propto kx^2$
Direct proportion $y \propto k\sqrt[3]{x}$
Direct proportion $y \propto kx^3$
Direct proportion $y \propto k\sqrt{x}$
Direct proportion - formula - mixture
Inverse proportion : $y \propto \frac{k}{x}$
Inverse proportion : $y \propto \frac{k}{x^2}$
Inverse proportion $y \propto \frac{k}{\sqrt{x}}$
Inverse proportion - mixture
Proportion - mixture
Direct and inverse proportion
Square root and direct proportion
Square root and inverse square proportion
Square and inverse square proportion
Inverse and square proportion
Inverse root and square proportion
Inverse and square root proportion

Direct and inverse proportion formulae *continued*

Inverse square and square root proportion

Direct and inverse proportion formulae *continued*

Mixture - Direct/inverse proportion

04 EDEXCEL INTERNATIONAL GCSE Sequences, functions and graphs

31 topics
350 structures

Sequences

Continuing and missing terms 15

Continue a linear sequence (integers)
Directed numbers
Sequence given the first term and rule (+)
Sequence given the first term and rule (-)
Sequence given the first term and rule
Geometric given the first term and rule
Sequence (fractions) - nth term
Sequence iterative formula
Fibonacci sequence
Continue a geometric sequence
Specific terms in a geometric sequence
Next term of a non-linear sequence
Fractions and sequences
Algebraic sequences
Mixture - sequences

nth term 12

Generate a linear sequence - nth term
Find the nth term linear - inc
Find the nth term linear - dec
Find the nth term linear - mixture
Find the nth term fractions
Find and use the nth term linear
Generate a quadratic sequence - nth term
Find the nth term quadratic
Find the 10th term - quadratic
Find the nth term - linear/quadratic
Find the nth term - linear/quadratic/fractions
Mixture - nth term

Arithmetic - sums and formula HIGHER 14

Find a specific term
Find the first term
Find the common difference
Find a specific term
Find the sum - first n terms
Find the first term - sum known
Find the last term - sum known
Find the first term
Find the number of terms - sum known
Find the sum - first n terms
Find the common difference
Find the last term
Calculate the number of terms
Calculate the sum

Graphs

Graphs in practical situations · Travel and conversion graphs 8

Distance time - questions
Conversion graph - currency
Conversion graph - miles and kilometres
Conversion graph - cost
Rate graph - filling a tank

Graphs in practical situations · Travel and conversion graphs *continued*

Rate graph - burning candle
Rate graph - cooling
Mixture - conversion graphs

Graphs in practical situations · Estimating speed and acceleration HIGHER 5

Estimate speed (cyclist)
Estimate speed (vehicle)
Estimate acceleration
Estimate deceleration
Mixture - Estimating speed/acceleration

Linear graphs · Points on graphs 6

Complete a coordinate for $y = x \pm c$
Complete a coordinate for $y = mx$
Complete a coordinate for $y = mx \pm c$
Complete a coordinate mixture
Complete a coordinate $y = x^2 \pm bx \pm c$
Mixture - Points on graphs

Plotting and solving graphically · Plotting HIGHER 14

Positive quadratic $y = x^2 \pm bx \pm c$
Negative quadratic $y = -x^2 \pm bx \pm c$
Positive cubic $y = x^3 \pm bx^2 \pm cx \pm d$
Negative cubic $y = -x^3 \pm bx^2 \pm cx \pm d$
Reciprocal $y = \frac{a}{x}$
$y = \frac{a}{x^2}$
$xy = a$
$x^2y = a$
$y = \pm x^2 \pm \frac{a}{x}$
$y = \pm x^3 \pm \frac{a}{x}$
Sine $y = \pm\sin x$, $\pm b\sin x$, $\pm\sin x \pm b$
Cosine $y = \pm\cos x$, $\pm b\cos x$, $\pm\cos x \pm b$
Tangent $y = \pm\tan x$, $\pm b\tan x$, $\pm\tan x \pm b$
Mixture - Sketching graphs

Plotting and solving graphically · Plotting and solving 8

Linear equal to a constant
Two linear graphs
Quadratic equal to a constant
Quadratic and linear
Reciprocal and linear
$a + b\sqrt{x}$ and linear
$a \times b^x$=c
Mixture - Solving graphically

Quadratic graphs · Symmetry and roots 8

Quadratic graphs - points to plot
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 $y = ax^2 \pm bx \pm c$

Quadratic graphs · Symmetry and roots *continued*

Identify the roots from a graph
Mixture - Quadratic Graphs

Quadratic graphs - vertex · Finding the vertex HIGHER 6

State the vertex of a quadratic graph
Complete the square and find the vertex
Complete the square and find the vertex
Identify the vertex from a graph
Solve $x^2 \pm ax \pm b = \pm c$ from a graph
Mixture - Finding the vertex

Transforming Graphs · Finding a point HIGHER 12

Translation (+ve y)
Translation (-ve y)
Translation (-ve x)
Translation (+ve x)
Reflection (x-axis)
Reflection (y-axis)
Stretch (parallel to the y-axis)
Stretch (parallel to the x-axis)
Translation -ve x and +ve y
Translation -ve x and -ve y
Translation +ve x and +ve y
Mixture - Transforming Graphs

Transforming Graphs · Finding the resulting equation HIGHER 12

Translation (-ve y)
Translation (-ve x)
Translation (+ve x)
Reflection (x-axis)
Reflection (y-axis)
Stretch (parallel to the y axis)
Stretch (parallel to the x axis)
Translation -ve x and +ve y
Translation -ve x and -ve y
Translation +ve x and +ve y
Translation +ve x and -ve y
Transforming Graphs Quadratic (2): Mixture

Transforming Graphs · Sketching HIGHER 14

Translation (-ve y)
Translation (-ve x)
Translation (+ve x)
Reflection (x-axis)
Reflection (y-axis)
Stretch (parallel to the y-axis)
Stretch (parallel to the x-axis)
Translation -ve x and +ve y
Translation -ve x and -ve y
Translation +ve x and +ve y
Translation +ve x and -ve y
Reflection and stretch
Stretch and translation
Mixture - Sketching transformations

Coordinates in two dimensions 5

1st quadrant
2nd Quadrant
3rd Quadrant
4th Quadrant
All 4 Quadrants

Linear graphs · Identifying the gradient 7

Determine which is the steeper line
Identify the gradient (diagram)

Linear graphs · Identifying the gradient *continued*

Identify the gradient of $y = mx \pm c$
Identify the gradient after rearranging
Gradient of the line through (0,a) and (b,c)
Gradient of the line through (a,b) and (c,d)
Mixture - Gradient

Linear graphs · Finding the intercept 7

$y, axis$ intercept for $y = x \pm a$
$x, axis$ intercept for $y = x \pm a$
$y, axis$ intercept for $y = mx \pm c$
Intercept after rearranging
Gradient or intercept
Gradient or intercept after rearranging
Mixture - Finding the intercept

Linear graphs · Midpoint and length of a line segment HIGHER 4

Length of a line segment (1 d.p.)
Length of a line segment (exact)
Finding the midpoint
Mixture - midpoint/line segment

Linear graphs · Finding the equation of a line 11

Equation of a straight line
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 line - gradient and (a,b) given
Equation of a line $y = mx \pm c$ (grad >0)
Equation of a line $y = mx \pm c$ (grad < 0)
Equation of a line $y = mx \pm c$
Equation of a line $ax + by = c$
Mixture - equation of a line

Linear graphs · Parallel and perpendicular lines HIGHER 11

Parallel line - through (0,a) (1)
Parallel line - through (0,a) (2)
Parallel line - through (a,b) (1)
Parallel line - through (a,b) (2)
Parallel lines mixture
Perpendicular line - through (0,a) (1)
Perpendicular line - through (0,a) (2)
Perpendicular line - through (a,b) (1)
Perpendicularline - through (a,b) (2)
Perpendicular lines mixture
Mixture - Parallel/perpendicular

Using trig graphs HIGHER 3

Using the sine graph
Using the cosine graph
Using the tangent graph

Calculus

Estimating gradients of curves HIGHER 5

Estimating a gradient - quadratic
Estimating a gradient - cubic
Estimating a gradient - reciprocal
Estimating a gradient - exponential
Mixture - Estimating gradients

Differentiating polynomials HIGHER 18

Finding the gradient function ax^n
Finding the rate of change ax^n
Differentiation : $y = mx \pm c$

Differentiating polynomials *continued*

Differentiation : $y = mx^2 \pm c$
Differentiation : $y = ax^2 \pm bx$
Differentiation : $y = ax^2 \pm bx \pm c$
Differentiation : $y = ax^3 \pm c$
Differentiation : $y = ax^3 \pm bx$
Differentiation : $y = ax^3 \pm bx \pm c$
Differentiation : $y = ax^3 \pm bx^2$
Differentiation : $y = ax^3 \pm bx^2 \pm d$
Differentiation : $y = ax^3 \pm bx^2 \pm cx$
Differentiation : $y = ax^3 \pm bx^2 \pm cx \pm d$
Differentiation : $y = (x \pm a)(x \pm b)$
Differentiation : $y = (ax \pm c)(bx \pm d)$
Differentiation : $y = ax^3 + bx^2 + cx + d$
Differentiation : $y = ax^4 + bx^3$..
Mixture - Differentiating polynomials

Gradient at a point

HIGHER 11

Find the gradient : $y = ax^2 \pm c$
Find the gradient : $y = ax^2 \pm bx$
Find the gradient : $y = ax^2 \pm bx \pm c$
Find the gradient : $y = ax^3 \pm c$
Find the gradient : $y = ax^3 \pm bx$
Find the gradient : $y = ax^3 \pm bx \pm c$
Find the gradient : $y = ax^3 \pm bx^2$
Find the gradient : $y = ax^3 \pm bx^2 \pm c$
Find the gradient : $y = ax^3 \pm bx^2 \pm cx$
Find the gradient : $y = ax^3$.... $\pm d$
Mixture - Gradient at a point

Stationary points

HIGHER 4

Stationary points of $y = x^3 + .. + d$
Stationary points of a cubic - max or min
Stationary points of a quartic - max or min
Mixture - Stationary points

Problems in context

HIGHER 8

Time when instantaneously at rest
Displacement when instantaneously at rest
Time for a given velocity
Find the time for a given acceleration
Acceleration when the direction reverses
Moving in the same direction
Minimum speed
Mixture - Problems in context

Functions

Evaluating functions · Evaluating functions - f(x)

HIGHER 18

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

Evaluating functions · Evaluating functions - f(x) *continued*

Mixture - Evaluating functions

Evaluating functions · Evaluating functions - function notation

HIGHER 18

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

Inverse functions

HIGHER 45

$f(x) = x - a$
$f(x) = x + a$
$f(x) = a - x$
$f(x) = ax$
$f(x) = \frac{x}{a}$
$f(x) = \frac{a}{x}$
$f(x) = ax + b$
$f(x) = b - ax$
$f(x) = ax - b$
$f(x) = \frac{x+b}{a}$
$f(x) = \frac{x-b}{a}$
$f(x) = \frac{b-x}{a}$
$f(x) = \frac{a}{x+b}$
$f(x) = \frac{a}{x-b}$
$f(x) = \frac{x}{a} + b$
$f(x) = \frac{x}{a} - b$
$f(x) = \sqrt{x}$
$f(x) = a\sqrt{x}$
$f(x) = \sqrt{x + a}$
$f(x) = \sqrt{x - a}$
$f(x) = \sqrt{a - x}$
$f(x) = \frac{\sqrt{x}}{a}$
$f(x) = \frac{a}{\sqrt{x}}$
$f(x) = \sqrt{\frac{a}{x}}$
$f(x) = \sqrt{\frac{x}{a}}$
$f(x) = \sqrt{x} + a$
$f(x) = \sqrt{x} - a$
$f(x) = a - \sqrt{x}$
$f(x) = a\sqrt{x + b}$
$f(x) = a\sqrt{x - b}$
$f(x) = a + \sqrt{x - b}$
$f(x) = a - \sqrt{x - b}$
$f(x) = a - \sqrt{x + b}$
$f(x) = \frac{\sqrt{x+b}}{a}$
$f(x) = \sqrt{\frac{x-b}{a}}$
$f(x) = \sqrt{\frac{x+b}{a}}$
$f(x) = \frac{\sqrt{x}}{a} + b$
$f(x) = \frac{\sqrt{x}}{a} - b$
$f(x) = b - \frac{\sqrt{x}}{a}$
$f(x) = \sqrt{ax + b}$
$f(x) = \sqrt{ax - b}$

Inverse functions *continued*

$f(x) = \sqrt{b - ax}$
$f(x) = \frac{\sqrt{x}}{a} + b$
mixture
Mixture - Inverse functions

Composite functions · Composite functions f(x) HIGHER 12

$fg(x)\ f(x) = ax \pm b\ g(x) = cx \pm d$
$gf(x)\ f(x) = ax \pm b\ g(x) = cx \pm d$
$fg(x)\ f(x) = x^2\ g(x) = ax \pm b$
$g(x)\ f(x) = x^2\ g(x) = ax \pm b$
$fg(x)\ f(x) = ax^2\ g(x) = bx \pm c$
$gf(x)\ f(x) = ax^2\ g(x) = bx \pm c$
$fg(x)\ f(x) = x^2 \pm a\ g(x) = x \pm b$
$gf(x)\ f(x) = x^2 \pm a\ g(x) = x \pm b$
$fg(x)\ f(x) = a \pm bx\ g(x) = cx \pm d$
$gf(x)\ f(x) = a \pm bx\ g(x) = cx \pm d$
Mixture - composite functions
Inverse and composite mixture

Composite functions · Composite functions – function notation HIGHER 13

$fg(x)\ f : x \mapsto ax \pm b\ g : x \mapsto cx \pm d$
$gf(x)\ f : x \mapsto ax \pm b\ g : x \mapsto cx \pm d$
$fg(x)\ f : x \mapsto x^2\ g : x \mapsto ax \pm b$
$gf(x)\ f : x \mapsto x^2\ g : x \mapsto ax \pm b$
$fg(x)\ f : x \mapsto ax^2\ g : x \mapsto bx \pm c$

Composite functions · Composite functions – function notation *continued*

$gf(x)\ f : x \mapsto ax^2\ g : x \mapsto bx \pm c$
$fg(x)\ f : x \mapsto x^2 \pm a\ g : x \mapsto x \pm b$
$gf(x)\ f : x \mapsto x^2 \pm a\ g : x \mapsto x \pm b$
$fg(x)\ f : x \mapsto a \pm bx\ g : x \mapsto cx \pm d$
$gf(x)\ f : x \mapsto a \pm bx\ g : x \mapsto cx \pm d$
Mixture - composite functions
Inverse and composite mixture
Mixture - Function notation

Domain and range HIGHER 16

Domain of $\sqrt{x \pm a}$
Domain of $\sqrt{a - x}$
Domain of $\frac{a}{x \pm b}$
Domain of $\frac{a}{\sqrt{x \pm b}}$
Find the range of $y = ax + b$
Find the range of $y = b - ax$
Find the range of $y = ax + b$
Find the range of $y = b - ax$
Find the range of $y = x^2$
Find the range of $y = x^2 \pm c$
Find the range of $y = a - x^2$
Find the range of $y = ax^2 \pm c$
Find the range of $y = b - ax^2$
Find the range of $y = ax^2 \pm bx$
Find the range of $y = bx - ax^2$
Mixture - Domain and range

EDEXCEL INTERNATIONAL GCSE

05 Vectors and Transformations Geometry

10 topics
69 structures

Transformation geometry

Reflection 9

Reflection x = a
Reflection y = a
Reflection mix (1 & 2)
Reflection y = x
Reflection y = -x
Reflection mix (1 - 4)
Image after reflection in $x = a$ or $y = a$
Image after reflection in $y = x$
Mixture - Reflection

Translation 5

Translation - x direction
Translation - y direction
Translation
Image after a translation by a vector
Mixture - Translation

Enlargement · Positive and fractional scale factors 6

Enlargement : scale factor 2
Enlargement : scale factor 2
Enlargement scale factor 0.5
Enlarge from the origin
Enlarge from $(\pm 1, \pm 1)$
Mixture - enlargement (1)

Enlargement · Negative scale factors HIGHER 6

Enlargement scale factor -2

Enlargement · Negative scale factors *continued*

Enlargement scale factor -0.5
Enlargement - negative scale factor
Enlarge from the origin (negative)
Enlarge from $(\pm 1, \pm 1)$ (negative)
Mixture - enlargement (2)

Rotation 6

Rotation : $90°$ Clockwise
Rotation : $90°$ Clockwise
Rotation : $180°$ Anti-clockwise
Image after rotation about the origin
Image after a $270°$ rotation about the origin
Mixture - Rotation

Combined transformations 1

Image after two combined transformations

Vectors

Column vectors HIGHER 9

Column vectors - sum and difference
Column vectors - missing values
Column vectors mixture
Writing as a column vector
Vectors Simplifying
Vectors: Simplifying
Vectors: finding missing values
Vectors: finding missing values
Mixture - Column vectors

Magnitude of a vector

HIGHER 5

- Magnitude of a column vector
- Vector between two points and magnitude
- Magnitude of $\overrightarrow{BC}$ in a triangle
- Movement as a vector and magnitude
- Mixture - Magnitude

Vector geometry · (1)

HIGHER 14

- Vector geometry
- Parallel vectors
- Ratio division on a line
- Position vector and magnitude
- Collinear points
- Vector $\overrightarrow{BC}$ in a triangle
- Resultant vector path
- Position vector in terms of $\mathbf{a}$ and $\mathbf{b}$
- Parallelogram position vector

Vector geometry · (1)

continued

- Ratio on a vector
- Midpoint position vector
- Midpoint vector $\overrightarrow{AM}$ or $\overrightarrow{MB}$
- Vector geometry mixture
- Mixture - Vector geometry

Vector geometry · (2)

HIGHER 8

- Ratio $AP : PM$
- Vector $\overrightarrow{ON}$ in a trapezium
- Vector $\overrightarrow{OP}$ at an intersection
- Ratio $CD : DE$
- Ratio $AQ : QC$
- Vector $\overrightarrow{AC}$
- Vector $\overrightarrow{AN}$
- Mixture - vector geometry

06 EDEXCEL INTERNATIONAL GCSE Probability

7 topics
132 structures

Introduction to probability

Single events and complementary probability

29

- Spinners P(shaded)
- Spinner P(unshaded)
- Words P(vowel)
- n sided dice P(n > m)
- n sided dice P(multiples/squares/primes)
- Numbered counters P(multiples/primes..)
- Picking counters - P(single colour)
- Picking counters - P(single colour)
- Picking counters - P(colour A or B)
- Picking counters - P(colour A or B)
- Sports choices - P(A or B)
- Probability mixture
- Vowels in words P(not a vowel)
- n sided dice P(not an even number)
- n sided dice P(not a square number)
- Picking counters -P(not A)
- Picking counters — P(not A or B)
- Sports choices
- Biased coin
- Biased game
- Sandwich choices
- Spinner
- Sports game
- Biased coin
- Biased game
- Sandwich choices
- Spinner
- Sports game
- Mixture - Single events

Relative and expected frequencies

Relative frequency and expected outcomes

11

- Biased dice
- Seeds
- Sweet flavours
- Test questions
- Coin — relative frequency
- Coin — relative frequency/expected
- Bus late — relative frequency

Relative frequency and expected outcomes

continued

- Bus late — relative frequency/expected
- Spinner — relative frequency
- Spinner — relative frequency/expected
- Mixture - Relative frequency/expected outcomes

Probability of combined events

Listing outcomes and sample spaces · Listing

11

- Drinks machine
- Drinks machine — different drinks
- Pizza — 2 toppings
- Pizza — 3 toppings
- 2-letter codes (repeat allowed)
- 2-letter codes (no repeat)
- 3-letter codes (no repeat)
- Sports matches (3)
- Sports matches (4)
- Sports matches (5)
- Mixture - Listing

Listing outcomes and sample spaces · Sample Spaces

23

- Two 4-sided dice - sum
- Two 4-sided dice - difference
- Two 4-sided dice - product
- Two 6-sided dice - sum
- Two 6-sided dice - difference
- Two 6-sided dice - product
- 6 and 4-sided dice- sum
- 6 and 4-sided dice - product
- 6 and 4-sided dice - difference
- Coin and spinner — double / half score
- Coin and die — multiply by n or m
- Two 4-sided dice - sum
- Two 4-sided dice - difference
- Two 4-sided dice - product
- Two 6-sided dice - sum
- Two 6-sided dice - product
- Two 6-sided dice - difference
- 6 and 4-sided dice - sum
- 6 and 4-sided dice - product
- 6 and 4-sided dice - difference

Listing outcomes and sample spaces · Sample Spaces *continued*

- Coin and spinner
- Coin and die
- Mixture - Sample Spaces

Venn diagrams · Probability 11

- Venn probability - two sports
- Venn probability - pens
- Venn probability - cars
- Venn probability - reading and glasses
- Venn probability - subjects
- Venn with probabilities - find P (words)
- Venn with probabilities - find P (set notation)
- Venn Diagrams : Mixture
- Three-set Venn diagram from a survey
- Two-set Venn diagram from a survey
- Mixture - venn

Tree diagrams — independent events 25

- Probability Trees (1) - compeleted diagram
- Probability Trees (1) - blank diagram
- Probability Trees (1) - no diagram
- Probability Trees (2) - completed diagram
- Probability Trees (2) - blank diagram
- Probability Trees (2) - no diagram
- Probability Trees (3) - completed diagram
- Probability Trees (3) - blank diagram
- Probability Trees (3) - no diagram
- Probability Trees (1) - compeleted diagram
- Probability Trees (1) - blank diagram
- Probability Trees (1) - no diagram
- Probability Trees (2) - completed diagram
- Probability Trees (2) - blank diagram
- Probability Trees (2) - no diagram
- Probability Trees (3) - completed diagram

Tree diagrams — independent events *continued*

- Probability Trees (3) - blank diagram
- Probability Trees (3) - no diagram
- Probability Trees (4) - completed diagram
- Probability Trees (4) - blank diagram
- Probability Trees (4) - no diagram
- Probability Trees (5) - completed diagram
- Probability Trees (5) - blank diagram
- Probability Trees (5) - no diagram
- Mixture - Tree diagrams

Conditional probability

Dependent events and conditional probability HIGHER 22

- Sampling without replacement - diagram
- Sampling without replacement - blank
- Sampling without replacement - no diagram
- Quiz team - completed diagram
- Quiz team - blank diagram
- Quiz team - no diagram
- Socks in a drawer - completed diagram
- Socks in a drawer - blank diagram
- Socks in a drawer - no diagram
- School bus - completed diagram
- School bus - blank diagram
- School bus - no diagram
- Late for work - completed diagram
- Late for work - blank diagram
- Late for work - no diagram
- Conditional probability - Venn (1)
- Conditional probability - Venn (2))
- Conditional probability - Venn mixture
- Two-way table - conditional probability (2×2)
- Two-way table - conditional probability (3×2)
- Two-way table - probabilities
- Mixture - Dependent/conditional

07 EDEXCEL INTERNATIONAL GCSE Statistics

11 topics
85 structures

Graphical representation of data

Tally charts, frequency tables and two-way tables 8

- Complete a tally table
- Draw and complete a tally table
- Discrete Data - tally and frequency
- Grouped Data - tally and frequency
- 2 way tables - completing
- 2 way tables - completing
- 2 way tables - completing mixture
- Mixture - tables

Reading and comparing data 7

- Reading tables
- Reading tables - footballers
- Reading a temperature table
- 2 way tables - reading
- Timetables
- Using a calendar
- Mixture - Reading - tables

Pictograms and bar charts 12

- Interpret pictograms

Pictograms and bar charts *continued*

- Complete pictograms
- Draw pictograms
- Bar charts - reading
- Bar charts - drawing - grid with axes
- Bar charts - drawing - grid
- Bar charts - drawing
- Dual Bar charts - reading
- Dual Bar charts - drawing - grid with axes
- Dual Bar charts - drawing - grid
- Dual Bar charts - drawing
- Mixture - Pictograms/bar charts

Pie charts and line graphs · Pie charts 10

- Pie Charts - drawing
- Pie Charts - drawing - multiples of 10%
- Pie Charts - reading
- Pie Charts - reading
- Pie Charts - reading
- Pie Charts - reading
- Pie Charts - reading
- Pie Charts - reading
- Pie Charts - calculating angles
- Mixture - Pie charts

Pie charts and line graphs · Line Graphs 6

- Line Graphs - reading
- Line Graphs - drawing - grid with axes
- Line graphs - drawing - grid
- Line graphs - drawing
- Line graphs - (reading 2 lines)
- Mixture - Line Graphs

Stem-and-leaf and frequency polygons 6

- Median from a stem-and-leaf diagram
- Range from a stem-and-leaf diagram
- Draw an ordered stem-and-leaf diagram
- Midpoints for a frequency polygon
- Modal class from a frequency polygon table
- Mixture - Stem-and-leaf/frequency polygons

Scatter diagrams 5

- Plot and line of best fit (positive correlation)
- Plot and line of best fit (negative correlation)
- Line of best fit and estimate (positive)
- Line of best fit and estimate (negative)
- Mixture - Scatter diagrams

Cumulative frequency HIGHER 6

- Plot a cumulative frequency graph
- Plotting and extracting information
- Reading quartiles
- Reading other information
- Reading other information (%)
- Mixture - Cumulative frequency

Histograms HIGHER 10

- Calculate frequency density
- Frequency from density and width
- Read frequency from a histogram
- Draw a histogram
- Draw a histogram from a table
- Find the total from a histogram
- Frequency in a range (scale omitted)
- Frequency in a range (total given)
- Estimate from a histogram
- Mixture - Histograms

Statistical measures

Averages from a list 10

- Calculate the range
- Calculate the mean - from a list
- Mean given - find a missing value
- Calculate the median
- Calculate the range and median
- Calculate the mean,median or range
- Find the mode
- Find the mode,mean or median
- Find the min/max - range given
- Mixture - Averages (1)

Averages from a table 5

- Calculate the mean
- Calculate the median
- Calculate the range
- Estimate the mean
- Mixture - Averages (2)