

YR11

Solving Quadratic Equations and Sketching Graphs

How do I factorise quadratic expressions of the form $ax^2 + bx + c$?
How do I recall the quadratic formula?
How do I identify roots from a graph?
How do I recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, and the reciprocal function?

Direct and Inverse proportion

How do I solve problems involving direct and inverse proportion, including graphical and algebraic representations?
Do I understand that X is inversely proportional to Y is equivalent to X is proportional to $1/Y$?

Volume

Do I know how to apply formulae to calculate volume of: spheres, pyramids, cones and composite solids?
Given the volume, how do I find other missing measurements of 3D shapes?

Growth and Decay and Graphs

How do I set up, solve and interpret the answers in growth and decay problems, including compound interest?
How do I calculate missing coordinates on an exponential graph?

Numerical Methods

How do I find approximate solutions to equations numerically using iteration including the use of suffix notation?
How do I input an iterative formula into my calculator?

Equation of a Circle

How do I Recognise and use the equation of a circle with centre at the origin?
How do I find the equation of a tangent to a circle at a given point?

Simultaneous Equations

How do I solve two simultaneous equations, where one is linear and the other quadratic?

Inequalities

How do I represent an inequality (linear or quadratic) as a region on a set of axes?

Sine and cosine rules

How do I apply the Sine rule to find unknown lengths and angles?
How do I apply the Cosine rule to find unknown lengths and angles?
What is the formula to find the area of a non-right angled triangle?

Trig graphs

What do the graphs of Sine, Cosine and Tangent look like?
How do I use the symmetry of the graphs to find equivalent angles?

Transforming graphs

How do I sketch translations and reflections of a given function?
What effect does a translation of $(0,1)$ have on the equation of a function?

Cumulative Frequency and Box plots

How do I plot a cumulative frequency graph given a table of data?
How do I estimate the median from a cumulative frequency graph?
What are the five main values needed to draw a box plot?

Histograms and Frequency Polygons

What does the area of each bar of a histogram represent?
How can I calculate frequency density?
How do I draw a histogram from given data?



Vectors

What are the different notations to name or identify a vector?
Can I use vectors to construct geometric arguments and proofs?

Functions

Given a function, how could I calculate the inverse function?
Which order should I substitute the functions to calculate $fg(x)$?



Circle theorems

What do I know about the angle between a radius and a tangent?
How do I draw a diagram to represent the alternate segment theorem?

Gradients and rate of change, area under a curve

How do I interpret the gradient at a point on a curve as the instantaneous rate of change?
How do I apply the concepts of average rate of change using a chord?
What does the area under a velocity-time graph represent?

Sketching Graphs

How do I recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, and the reciprocal function?

Proofs

How can I express an odd number algebraically?
How do I express a series of consecutive numbers algebraically?

Algebraic fractions

What is the first thing you should always do (if possible) when working with algebraic fractions?
Why can't we simplify $(x+1)/(x-1)$?

Direct and Inverse proportion

How do I solve problems involving direct and inverse proportion, including graphical and algebraic representations?
Do I understand that X is inversely proportional to Y is equivalent to X is proportional to $1/Y$?

Inequalities

How do I solve linear inequalities?
How can I use a sketch graph to help solve quadratic inequalities?
How do I represent solution sets on a number line, using set notation and on a graph?

Pythagoras Theorem and Basic Trigonometry

Do I know the formula for Pythagoras' Theorem?
How do I apply basic trigonometry to find sides and angles in right-angled triangles?
Do I know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° ?
Do I know the exact value of $\tan \theta$ for $0^\circ, 30^\circ, 45^\circ, 60^\circ$?

Vectors

How do I apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors?
How do I use vectors to construct geometric arguments and proofs?

Growth and Decay

What is the difference between simple and compound interest?
Do I know how to use an iterative formula?
Can I solve growth and decay problems using multipliers or iterative processes?
What does an exponential graph look like?

Transforming Functions

Can I sketch translations and reflections of a given function?

Sine and Cosine Rules

Can I apply the Sine and Cosine rules to find unknown lengths and angles?
Can I apply $\text{Area} = \frac{1}{2} ab \sin C$ to calculate the area, sides or angles of any triangle?

Circle Theorems

Can I apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results?

Gradients and rates of change

How do I interpret the gradient at a point on a curve as the instantaneous rate of change?
How do I apply the concepts of average and instantaneous rates of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts?
How do I interpret the gradient of a straight-line graph as a rate of change?

Pre-calculus and area under a curve

How do I calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs)?
How do I interpret the results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts?

Algebraic Fractions

How do I simplify and manipulate algebraic expressions involving algebraic fractions?

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