Contents

Real Numbers

Themes

Properties of real numbers; whole numbers, natural numbers, integers, fractions, rational numbers, square roots, irrational numbers

Vocabulary

Definitions of types of numbers; properties of real numbers, derivatives Common procedures followed by mathematicians: factoring, using reciprocals/ division, collecting like items, using average, converting to decimal or fractional notation

Writing

Paragraph structure, cohesion and coherence

Note-taking

Identifying main points in a lecture: "Imaginary and complex numbers" contents

Algebraic Expressions, Equations and Functions 2

Themes

Algebraic expressions, equations and functions

Discussion

Skimming and scanning, identifying main points

Vocabulary

Using a variety of words to describe arithmetic processes; translating "text" to algebra; reading functions and equations

Note-taking Linear style abbreviations and symbols

Style Introducing formality by comparing two excerpts

Exponents and Exponential Functions 3

Themes

Exponents and exponential functions; exponential decay and growth; geometric progressions and scientific notation

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Academic vocabulary

Definitions;

Writing the product as a monomial in a standard form Numbers of Science: Conversions from Metric system to English Metric prefixes for powers of 10 Comparing objects of widely different sizes: orders of magnitude

Academic writing and style

Introduction to paraphrasing; Expressing cause and effect as a paraphrasing tool

4 Introduction to Reasoning and Proof

Themes

The language of proofs regarding segments; inductive and deductive reasoning, theorems, logic tables, axioms, methods of proof

Discussion Useful phrases

Vocabulary Definitions of Logic Theory terms

Writing

The language and symbols of proofs

Note-taking

Writing Mathematical proofs by induction, identifying the base, hypothesis and conclusion

5 Introduction to Probability

Themes

Introduction to probability, random events, random variables and their categorisations, density and distribution functions, notation and axiomatic definition of probability

Vocabulary

Definitions of probability related terms; collocations; notation in probability, adverbial phrases

Academic style Introduction to academic caution; modal verbs and the lack of tentative language in Mathematics

Note-taking Peer-reviewing notes on probability webinar

Contents

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Introduction to Statistics 6

Themes

Data, sample population, numerical descriptors, rational equations and functions; descriptive and inferential statistics, statistical significance; standard deviation, coefficient of variation, mean, median; graphs

Vocabulary Statistics: Definitions Word formation and use-in-context

135

159

Language The use of gerund and infinitive in Mathematics

Presentation/Writing

Reporting graphs and charts

Writing

Writing a report following a chart or graph Plagiarism, citations and references; why and how we use them

Geometry connections

Themes

Introduction to Geometry; lines, points, planes and angles, parallel and perpendicular lines

Discussion

Expressing agreement, disagreement or acknowledgement

Academic vocabulary

Use in context, definitions of popular mathematical terms Geometric shapes: 2D and 3D definitions Giving examples

Academic writing

Summary guidelines and practice

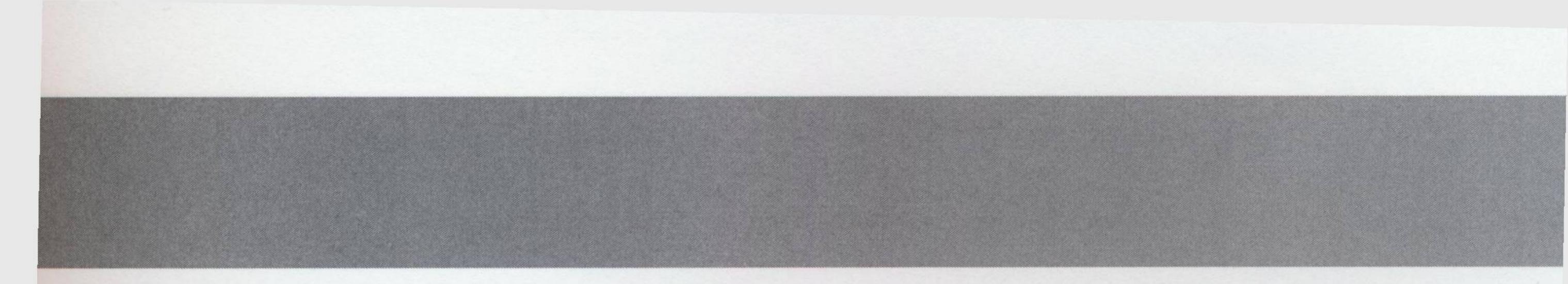
Note-taking Identifying the moves in a lecture; using reference verbs

Properties of Triangles 8

Themes

Triangles; main and secondary elements of a triangle, types of triangles by lengths of sides, classification according to internal angles, the Pythagorean Theorem, the concepts of congruence and similarity

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Vocabulary

Definitions; use-in-context: types of triangles Writing a two-column proof Making comparisons

Writing Passive voice

Presentation Opening/closing phrases and transitions

9 Introduction to Trigonometry

Themes

Right triangle Trigonometry, ratios, sine, cosine, tangent, trigonometric identities, function graphs

Academic vocabulary The language of theorems, axioms and proofs

Note-taking practice The unit circle

Academic presentation skills

Signposting language that engages your audience enhances the impact of your speech

10 The Geometry of the Circle

197

175

Themes

Properties of circles; chords, tangents, secants, equations and graphs of circles

Vocabulary

Use-in-context; definitions Geometry tools

Note-taking Equations and graphs of circles

Writing

How to write an argumentative essay on "Pure vs. Applied Mathematics" Using evaluative language to unfavour someone's view

11 Polygons and Quadrilaterals

Themes

Polygons and quadrilaterals; parallelograms, rhombi, rectangles, squares, kites and trapezoids Ratios, proportions and similarity applied to polygons and quadrilaterals, proportionality with parallel lines, dilations and fractions

Vocabulary

Definitions; use-in-context; adjective suffixes

Academic language focus Subject verb agreement; quantifiers

Academic style Avoiding wordiness and repetition

Academic presentation skills

From text to slides Using visuals to enhance the impact of your presentation

Note-taking Tessellations

12 The Geometry of Three Dimensions

225

Themes

Introduction to the geometry of three dimensions, points and lines in space, coordinate systems, polyhedra and solids of revolution

Academic vocabulary

Definitions: use in context

Academic style

Formality and complexity; Comparing texts written for different audiences

Introduction to critical reading Common pitfalls when writing a scientific paper

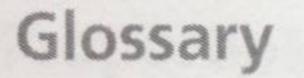
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Evaluation criteria

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