Aligned to DBE Revised ATPs

# Platinum Mathematics

## Navigation pack

FET PHASE
GRADE 10

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Mathematics Grade 10 Navigation Pack

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# Dear Teacher

The National State of Disaster due to the COVID-19 pandemic has resulted in the disruption of Education in South Africa and the loss of valuable teaching time and disruption of the school calendar.

As a result of this, the DBE has created and released revised Annual Teaching Plans (ATPs) to assist schools and teachers in ensuring the 2021 school year is completed. The 2021 ATPs are based on the revised ATPs that were developed in 2020. It is important to note that fundamental and core topics are retained in the 2021 ATPs. Some of the strategies that have been used in the process of developing the 2021 DBE ATPs are:

- reduction of content covered in certain topics
- merging of topics
- deleting topics
- revising the assessment guidelines
- reduction in teaching time for certain topics
- resequencing of topics/concepts

At Pearson South Africa, we believe that education is the key to every individuals' success. To ensure that despite the challenges, teachers and learners can meet all the necessary learning outcomes for the year, we have created the Navigation Guide, a free resource to support teachers and learners during this challenging time.

The Navigation Pack aims to summarise and highlight the changes in the 2021 DBE ATP and provide teachers and learners with worksheets that focus on impacted topics in the curriculum.

Due to resequencing of topics, the order of topics in the textbook that is currently used in the classroom may not be aligned to the new sequence of topics in the ATP. Pearson has included page numbers from one of our tried and tested series, Platinum, to guide the teacher and learners as they navigate through the textbook, with the 2021 ATP. The Navigation Pack has a set of assessments based on the Section 4 changes and the revised assessment guidelines.

# COVID-19 safety guidelines for teachers and learners

## Gatherings at school

Where schools are open for learning, it is up to management to take decisive action to ensure sites are not simultaneously used for other functions such as shelters or treatment units in order to reduce the risk.

**Implement social distancing practices that may include:**

- A staggered timetable, where teachers and learners do not arrive/leave at the same time for the beginning and end of the school day.
- Cancelling any community meetings/events such as assemblies, cake sales, market d y, tuckshop, after-care classes, matric dance, Eisteddfod and other events.
- Cancelling any extra-mural activities such as ballet classes, swimming lessons, sport games, music class and other events that create a crowd gathering.
- Teaching and modeling creating space and avoiding unnecessary touching.
- Limiting movement and interaction between classes.
- Schools with an established feeding scheme plan are to ensure that hygiene and social distancing is always implemented. Teachers and staff members assisting with food
- distribution are to wear masks, sanitise prior to issuing food items and learners are to stand 1,5m apart in the queue.

**Wear a mask at all times.**

## 1. Restrooms/toilets

### Hand washing

Washing hands with soap and water or using alcohol-based hand sanitisers is one of the most important ways to help everybody stay healthy at school. Critical to this is preparing and maintaining handwashing stations with soap and water at the toilet and in each classroom.


Teachers and learners should always wash their hands after:

- eating
- entering the classroom
- using the toilet
- blowing your nose or coughing
- touching tears, mucous, saliva, blood or sweat.

## 2. Premises and Classroom setting

When schools open, classroom settings should be altered in order to promote hygiene, safety and social distancing.

**Changed classroom settings may include:**

- Cleaning and disinfecting school buildings, classrooms and especially sanitation of facilities at least once a day, particularly surfaces that are touched by many people (railings, lunch tables, sports equipment, door and window handles, toys, teaching and learning tools etc.).
- Ensure the proper ventilation and fresh flow of air through classrooms.
- Providing learners with vital information about how to protect themselves by incorporating the importance of hygiene, handwashing and other measures of protecting themselves, into the lessons.
- Promoting best handwashing and hygiene practices and providing hygiene supplies.

- Prepare and maintain handwashing stations with soap and water, and if possible, place alcohol-based hand sanitisers in each classroom, at entrances and exits, and near lunchrooms and toilets.


- Ensure teachers and learners wear a mask at all times.

**Social distancing**

- Space the learners out in the classroom (or outdoors) – try to keep learners separated by a minimum of 1,5m.


- Create space for learner's desks to be at least 1,5m apart
- Learners are not to exceed 30 per class or 50% of original class size


- Learners should not share cups, eating utensils, or food
- Do not let learners eat items that fall on the floor or chew on pencils or other objects
- Avoid close contact, like shaking hands, hugging or kissing

## 3. Social behaviour

It is extremely vital during a pandemic that focus is not only directed towards optimal physical health and hygiene but fi nding ways to facilitate mental health support.

- Treat everybody with respect and empathy – no teasing about COVID-19.
- Encourage kindness towards each other and avoid any stereotyping when talking about the virus.
- Stay home if you have a temperature or are ill.
- Do not touch people who are ill, but be empathetic.

**Wear a mask at all times.**

# How to use this Navigation Pack

**Revised DBE Teaching Plan:** Comprehensive summary of the CAPS topics according to the revised ATPs.

**Navigation Plan:** Link to the Platinum series, as well as additional resources in the Navigation Pack.

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| ASSESSMENTS | | | | Navigation Pack: Targeted worksheet 2 | Page 36 – 37 |
| MEASUREMENT*11 | Unit 1: Volume and surface area of shapes | Revise the volume and surface areas of right-prisms and cylinders. | 2 weeks | Platinum LB<br>Platinum TG | Page 268 – 275<br>Page 195 – 196 |
| | | Study the effect on volume and surface area when multiplying any dimension by a constant factor *k*. | | | |
| | Unit 2: Volume and surface area of combined shapes | Calculate the volume and surface areas of spheres, right pyramids, right-cones and a combination of those objects (figures). | | Platinum LB<br>Platinum TG | Page 276 – 279<br>Page 202 – 205 |
| REVISION | | | | Platinum LB Topic Revision<br>Platinum TG Topic Revision Memorandum | Page 280 – 281<br>Page 205 – 208 |
| | | | | Platinum TG Worksheet A (solutions)<br>Platinum TG Worksheet B (solutions) | Page 265 (314 – 315)<br>Page 266 (316) |
| ASSESSMENTS | Task 3: Assignment | | | | |
| | Task 4 : Test | | | Navigation Pack:Term 2 Test Exemplar | Page 42 – 44<br>Page 64 – 65 |
| TOTAL WEEKS = 10 | | | | | |

*11 Measurement has moved from Term 3 to Term 2.

Assessments for the Term as per the revised ATPs and the Section 4 amendments.

Footnotes provide any additional information.

Link to a targeted worksheet in the Navigation Pack, that focus on impacted or challenging topics in the curriculum.

Link to an exemplar assessment in the Navigation Pack, that was created with Section 4 and curriculum changes in mind.

# Navigation Guide

GRADE 10

# Mathematics**[1]

| TERM | TOPIC | TIME (WEEKS) |
|---|---|---|
| TERM 1 | Algebraic expressions | 4 |
| | Exponents, equations and inequalities | 3 |
| | Euclidean Geometry | 3 |
| TERM 2 | Trigonometry | 2 |
| | Number Patterns | 1 |
| | Functions (including Trigonometric functions) | 5 |
| | Measurement | 2 |
| TERM 3 | Trigonometry (2D) | 2 |
| | Statistics | 2 |
| | Probability | 2 |
| | Finance and growth | 2 |
| | Analytical geometry | 2 |
| TERM 4 | Euclidean Geometry | 2 |

## Programme of Assessment**[2]

| TERM 1 | TERM 2 | TERM 3 | TERM 4 |
|---|---|---|---|
| Task 1<br>Investigation / Project (**15%**) | Task 3<br>Assignment (**15%**) | Task 5<br>Test (**10%**) | Task 7<br>Test (**10%**) |
| Task 2<br>Test (**10%**) | Task 4<br>Test (**10%**) | Task 6<br>Test **(10%)** | Final Examination |
| **For reporting** 25% inv/pro<br>75% Test | **For reporting**<br>25% assignment<br>75% Test | **For reporting**<br>50% Test<br>50% Test | |

**[1] No important aspect in Mathematics curriculum is compromised.
**[2] The amended School Based Assessment (SBA) is aligned to the content and time available. Informal tasks and activities should be used as assessment for learning, to prepare for formal assessment.

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| ALGEBRAIC EXPRESSIONS | Unit 1: Real numbers | Understand that real numbers can be rational or irrational. | 4 weeks | Platinum LB*1<br>Platinum TG*2 | Page 6 – 7<br>Page 4 |
| | Unit 2: Surds | Establish between which two integers a given simple surd lies. | | Platinum LB<br>Platinum TG | Page 8 – 9<br>Page 4 |
| | Unit 3: Appropriate rounding | Round real numbers to an appropriate degree of accuracy. | | Platinum LB<br>Platinum TG | Page 10 – 11<br>Page 5 |
| | Unit 4: Multiply a binomial by a trinomial | Multiplication of a binomial by a trinomial. | | Platinum LB<br>Platinum TG | Page 12 – 15<br>Page 5 – 7 |
| | Unit 5: Factorising | Factorisation to include types taught in Grade 9 and trinomials grouping in pairs sum and difference of two cubes. | | Platinum LB<br>Platinum TG | Page 16 – 24<br>Page 7 – 14 |
| | Unit 7: Add and subtract algebraic fractions | Simplifying, adding and subtracting algebraic fractions using factorisation with denominators of cubes (limited to sum and difference of cubes). | | Platinum LB<br>Platinum TG | Page 28 – 29<br>Page 16 – 17 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 30 – 31<br>Page 19 – 20 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 243 (271 – 272)<br>Page 244 (273 – 274) |

*1 LB is Learner's Book

*2 TG is Teacher's Guide

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| EXPONENTS, EQUATIONS, AND INEQUALITIES*3 | Unit 8: Revise the laws of exponents | Revise laws of exponents learnt in Grade 9 where:<br>$x, y > 0$; $m, n \in \mathbb{Z}$<br>$x^m \times x^n = x^{m+n}$<br>$x^m \div x^n = x^{m-n}$<br>$(x^m)^n = x^{mn}$<br>$x^m \times y^m = (xy)^m$<br>Also, by definition: $x^{-m} = \frac{1}{x^m}$; $x \neq 0$ and $x^0 = 1$; $x \neq 0$. | 3 weeks | Platinum LB<br>Platinum TG | Page 32 – 40<br>Page 23 – 26 |
| | Unit 9: Use the laws of exponents to simplify expressions and solve equations | Use the laws of exponents to simplify expressions and solve equations, accepting that the rules also hold for $m$, $n \in \mathbb{Q}$. | | Platinum LB<br>Platinum TG | Page 41 – 46<br>Page 27 – 31 |
| | Unit 1: Solve linear equations | Revise the solution of linear equations. | | Platinum LB<br>Platinum TG | Page 56 – 61<br>Page 37 – 41 |
| | Unit 2: Solve quadratic equations by factorisation | Solve quadratic equations (by factorisation). | | Platinum LB<br>Platinum TG | Page 62 – 66<br>Page 41 – 47 |
| | Unit 3: Solve simultaneous linear equations | Solve simultaneous linear equations in two unknowns. | | Platinum LB<br>Platinum TG | Page 67 – 70<br>Page 47 – 51 |
| | | Solve word problems involving linear, quadratic or simultaneous linear equations. | | Platinum LB<br>Platinum TG | Word problem is at the end of each Unit |
| | Unit 4: Solve literal equations by changing the subject of the formula | Solve literal equations (changing the subject of a formula). | | Platinum LB<br>Platinum TG | Page 71 – 74<br>Page 51 – 53 |
| | Unit 5: Solve linear inequalities | Solve linear inequalities (and show solution graphically). Interval notation must be known. | | Platinum LB<br>Platinum TG | Page 75 – 80<br>Page 53 – 59 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum<br>Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 45 – 46<br>Page 30 – 31<br>Page 81 – 82<br>Page 56 – 59 |

*3 Exponents, equations and inequalities are covered as one topic in Term 1.

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| **TOPIC** | **UNIT** | **CONTENT SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| REVISION | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 247 (279)<br>Page 248 (280) |
| EUCLIDEAN GEOMETRY *4 | Unit 1: Geometry: Revision from earlier grades | Investigate and form conjectures about the properties of special triangles, quadrilaterals and other polygons. Try to validate or prove conjectures using any logical method (Euclidean, co-ordinate or transformation geometry from Grade 9). | 3 weeks | Platinum LB<br>Platinum TG | Page 162 – 169<br>Page 119 – 120 |
| | Unit 2: Conjectures*5 | Disprove false conjectures by producing counter-examples. | | Platinum LB<br>Platinum TG | Page 170 – 177<br>Page 122 – 128 |
| | Unit 3: Investigate special quadrilaterals | Investigate alternative definitions of various polygons (including the isosceles, equilateral and right-angled triangle, the kite, parallelogram, rectangle, rhombus, square and trapezium). | | Platinum LB<br>Platinum TG | Page 178 – 179<br>Page 129 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 180 – 181<br>Page 129 – 133 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 253 (288 – 289)<br>Page 254 (290 – 293) |
| ASSESSMENTS | Task 1: Investigation or project | | | | |
| | Task 2: Test | | | Navigation Pack: Test Exemplar | Page 22 – 24 |
| **TOTAL WEEKS = 10** | | | | | |

*4 Euclidean Geometry has been moved from Term 2 to Term 1. The other section of this topic will be covered in Term 4.

*5 Learners need to be guided on explaining their mathematics reasoning when working with conjectures.

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| TRIGONOMETRY*6 | Trigonometric definitions | Extend the definitions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ for $0° < \theta < 360°$. | 2 weeks | Platinum LB<br>Platinum TG | Page 84 – 106<br>Page 60 – 73 |
| | Effect of parameters $a$ and $q$ on trigonometric graphs | Study the effect of $a$ and $q$ on the graphs defined by:<br>$y = a\sin\theta + q$,<br>$y = a\cos\theta + q$,<br>$y = a\tan\theta + q$, where $a$ and $q \in \mathbb{Q}$ and $\theta \in [0°; 360°]$. | | Platinum LB<br>Platinum TG | Page 137 – 143<br>Page 100 – 104 |
| | Sketch, use and interpret graphs*7 | Sketch graphs, find the equations of given graphs and interpret graphs.<br>Note: Sketching of graphs must be based on the observation of the effect of $a$ and $q$. | | Platinum LB<br>Platinum TG | Page 144 – 157<br>Page 105 – 112 |
| ASSESSMENTS | | | | Navigation Pack: Targeted worksheet 1 | Page 22 – 24<br>Page 34 – 35 |
| NUMBER PATTERNS*8 | Investigate number patterns | Patterns: Investigate number patterns leading to those where there is a constant difference between consecutive terms, and the general term (without using a formula – see content overview) is therefore linear. | 1 week | Platinum LB<br>Platinum TG | Page 48 – 51<br>Page 32 – 33 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 52 – 54<br>Page 33 – 35 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 245 (275 – 276)<br>Page 246 (277 – 278) |

*6 Trigonometry has been moved from Term 1 to Term 2.

*7 Use the knowledge of functions to help learners understand this unit.

*8 Number patterns has moved from Term 1 to Term 2.

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| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| FUNCTIONS [*9] (INCLUDING TRIGONOMETRIC FUNCTIONS | Unit 1: The concept of a function | The concept of a function, where a certain quantity (output value) uniquely depends on another quantity (input value). Work with relationships between variables using tables, graphs, words and formulae. Convert flexibly between these representations. | 5 weeks | Platinum LB<br>Platinum TG | Page 116 – 120<br>Page 81 – 84 |
| | Unit 2: Plot basic graphs and investigate the effect of $a$ and $q$ on the graphs | Point by point plotting of basic graphs defined by:<br>$y = x^2$; $y = \frac{1}{x}$ and $y = b^x$ (where $b > 0$ and $b \neq 1$)<br>to discover shape, domain (input values), range (output values), asymptotes, axes of symmetry, turning points and intercepts on the axes (where applicable). Sketch graphs, find the equations of given graphs and interpret graphs. | | Platinum LB<br>Platinum TG | Page 121 – 124<br>Page 81 – 84 |
| | | Investigate the effect of $a$ and $q$ on the graphs defined by:<br>$y = af(x) + q$, where $f(x) = x$, $f(x) = x^2$, $f(x) = b^x$, $b > 0$, $b \neq 1$.<br>Sketch graphs, find the equations of given graphs and interpret graphs.[*10] | | Platinum LB<br>Platinum TG | Page 125 – 136<br>Page 84 – 100 |
| ASSESSMENTS | | | | Navigation Pack: Targeted worksheet 2 | Page 36 – 37 |

[*9] Assess and use learners' prior knowledge to cover the topic. Use assessment for learning activities to provide learners with opportunities to practise.

[*10] Note: Sketching of the graphs must be based on the observation of the effect of $a$ and $q$.

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| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| MEASUREMENT*[11] | Unit 1: Volume and surface area of shapes | Revise the volume and surface areas of right-prisms and cylinders. | 2 weeks | Platinum LB<br>Platinum TG | Page 268 – 275<br>Page 195 – 196 |
| | | Study the effect on volume and surface area when multiplying any dimension by a constant factor $k$. | | | |
| | Unit 2: Volume and surface area of combined shapes | Calculate the volume and surface areas of spheres, right pyramids, right-cones and a combination of those objects (figures). | | Platinum LB<br>Platinum TG | Page 276 – 279<br>Page 202 – 205 |
| REVISION | | | | Platinum LB Topic Revision<br>Platinum TG Topic Revision Memorandum | Page 280 – 281<br>Page 205 – 208 |
| | | | | Platinum TG Worksheet A (solutions)<br>Platinum TG Worksheet B (solutions) | Page 265 (314 – 315)<br>Page 266 (316) |
| ASSESSMENTS | Task 3: Assignment | | | | |
| | Task 4 : Test | | | Navigation Pack:Term 2 Test Exemplar | Page 42 – 44<br>Page 64 – 65 |
| **TOTAL WEEKS = 10** | | | | | |

*[11] Measurement has moved from Term 3 to Term 2.

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| TRIGONOMETRY (2D) | Unit 1: Trigonometric problems with geometric properties | Revision: Trigonometric problems with geometric properties. | Self-study 2 weeks | Platinum LB<br>Platinum TG | Page 254 – 258<br>Page 185 – 188 |
| | Unit 2: Problems in two dimensions | Solve two dimensional Problems involving right-angled triangles. | | Platinum LB<br>Platinum TG | Page 259 – 264<br>Page 188 – 191 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 265 – 266<br>Page 191 – 194 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 263 (310 – 311)<br>Page 264 (312 – 313) |
| STATISTICS | Unit 1: Measures of central tendency: mean, median and mode | Revise measures of central tendency in ungrouped data. | 2 weeks | Platinum LB<br>Platinum TG | Page 224 – 226<br>Page 163 |
| | | Measures of central tendency in grouped data: calculation of mean estimate of grouped and ungrouped data, and identification of modal interval and interval in which the median lies. | | Platinum LB<br>Platinum TG | Page 226 – 230<br>Page 163 – 165 |
| | Unit 2: Measures of dispersion: range, percentiles, quartiles and interquartile and semi-interquartile range | Revision of range as a measure of dispersion and extension to include percentiles, quartiles, interquartile and semi-interquartile range. | | Platinum LB<br>Platinum TG | Page231 – 235<br>Page 165 – 167 |
| | Unit 3: Five-number summaries and box-and-whisker plots | Five-number summary (maximum, minimum and quartiles) and box-and-whisker diagram. | | Platinum LB<br>Platinum TG | Page 236 – 237<br>Page 167 – 168 |
| | Unit 4: Analysing and interpreting statistical summaries of data | Use the statistical summaries (measures of central tendency and dispersion), and graphs to analyse and make meaningful comments on the context associated with the given data. | | Platinum LB<br>Platinum TG | Page 238 – 241<br>Page 168 – 170 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 242 – 244<br>Page 170 – 172 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 261 (305 – 306)<br>Page 262 (307 – 308) |

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| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| PROBABILITY*[12] | Unit 1: Probability models | The use of probability models to compare the relative frequency of events with the theoretical probability. | 2 weeks | Platinum LB<br>Platinum TG | Page 288 – 293<br>Page 216 – 218 |
| | Unit 2: Venn diagrams and symbols | The use of Venn diagrams to solve probability problems, deriving and applying the following for any two events in a sample space $S$: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$; $A$ and $B$ are mutually exclusive if $P(A \text{ and } B) = 0$; $A$ and $B$ are complementary if they are mutually exclusive; and $P(A) + P(B) = 1$, then $P(B) = P(\text{not } A) = 1 - P(A)$. | | Platinum LB<br>Platinum TG | Page 293 – 299<br>Page 218 – 219 |
| REVISION | | | | Platinum LB Topic Revision<br>Platinum TG Topic Revision Memorandum | Page 300 – 301<br>Page 219 – 220 |
| | | | | Platinum TG Worksheet A (solutions)<br>Platinum TG Worksheet B (solutions) | Page 267 (317)<br>Page 268 (318) |
| FINANCE AND GROWTH | Unit 1: Simple and compound growth | Use the simple and compound growth formulae [$A = P(1 + in)$ and $A = P(1 + i)^n$] to solve problems, including interest, hire purchase, inflation, population growth and other real-life problems. | 2 weeks | Platinum LB<br>Platinum TG | Page 206 – 216<br>Page 152 – 156 |
| | Unit 2: Foreign exchange rates | Understand the implication of fluctuating foreign exchange rates (e.g., on the petrol price, imports, exports, overseas travel). | | Platinum LB<br>Platinum TG | Page 217 – 219<br>Page 156 – 158 |
| REVISION | | | | Platinum LB Topic Revision<br>Platinum TG Topic Revision Memorandum | Page 220 – 222<br>Page 158 – 161 |
| | | | | Platinum TG Worksheet A (solutions)<br>Platinum TG Worksheet B (solutions) | Page 257 (298 – 300)<br>Page 258 (301 – 302) |

*[12] Probability has moved from Term 4 to Term 3. Give learners numerous activities to build their terminology.

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|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| ANALYTICAL GEOMETRY | Represent geometric figures on a Cartesian coordinate system. | Derive and apply for any two points $(x_1; y_1)$ and $(x_2; y_2)$ and the formulae for calculating the: | 2 weeks | | |
| | Unit 1: The distance between two points | Distance between the two points. | | Platinum LB<br>Platinum TG | Page 186 – 190<br>Page 139 – 142 |
| | Unit 2: The gradient of a line segment | Gradient of the line segment connecting the two points (and from that identify parallel and perpendicular lines). | | Platinum LB<br>Platinum TG | Page 191 – 195<br>Page 142 – 144 |
| | Unit 3: The midpoint of a line segment | Coordinates of the midpoint of the line segment joining the two points. | | Platinum LB<br>Platinum TG | Page 196 – 202<br>Page 145 – 149 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 203 – 204<br>Page 149 – 151 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 255 (294 – 295)<br>Page 256 (296 – 297) |
| | | | | Navigation Pack: Targeted worksheet 3 | Page 30 – 33<br>Page 38 – 40 |
| ASSESSMENTS | Task 3: Test 1 | | | Navigation Pack: Term 3 Control Test 1<br>Exemplar | Page 45 – 47<br>Page 66 – 67 |
| | Task 4: Test 2 | | | Navigation Pack: Term 3 Control Test 2<br>Exemplar | Page 47 – 50<br>Page 68 – 69 |
| **TOTAL WEEKS = 10** | | | | | |

| REVISED DBE ANNUAL TEACHING PLAN | | | | NAVIGATION PLAN | |
|---|---|---|---|---|---|
| **TOPIC** | **UNIT** | **CONTENT – SPECIFIC CONCEPTS** | **TIME** | **LINKS TOPLATINUM SERIES AND PEARSON NAVIGATION PACK** | **PAGE REFERENCE** |
| EUCLIDEAN GEOMETRY*13 | Unit 1: Problems and proofs using geometric properties | Solve problems and prove riders using the properties of parallel lines, triangles and quadrilaterals. | 2 weeks | Platinum LB<br>Platinum TG | Page 251 – 252<br>Page 174 – 181 |
| REVISION | | | | Platinum LB: Topic Revision<br>Platinum TG: Topic Revision Memorandum | Page 203 – 204<br>Page 181 – 183 |
| | | | | Platinum TG: Worksheet A (solutions)<br>Platinum TG: Worksheet B (solutions) | Page 261 (305 – 306)<br>Page 262 (307 – 309) |
| ASSESSMENTS | Task 5: Test | | | Navigation Pack: Term 4 Control Test Exemplar | Page 51–53<br>Page 70 – 71 |
| | Task 6: Final Examination | | | Navigation Pack: Term 4 Final Examination Exemplars | Page 54 – 63<br>Page 72 – 77 |
| **TOTAL WEEKS = 2** | | | | | |

*13 Topic has been moved from Term 3 to Term 4. No content trimmed.

# Targeted Worksheets

| TARGETED WORKSHEET | TOPIC IN CAPS |
|---|---|
| 1 | Trigonometry |
| 2 | Functions |
| 3 | Analytical Geometry |

**Targeted Worksheet 1**

# Topic: Trigonometry

## Content summary

This worksheet focuses on:

- Question 1: Point in a plane
- Question 2: Trigonometric expressions
- Question 3: Trigonometric equations

Highlighting the following content knowledge needed:

1. The definition of the trigonometric ratios $\sin\theta$, $\cos\theta$ and $\tan\theta$, using right-angled triangles.
2. Extend the definitions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ for $0° \leq \theta \leq 360°$.
3. Values of the trigonometric ratios for the special angles without using a calculator.
   $\theta \in \{0°; 30°; 45°; 60°; 90°\}$
4. Use diagrams to determine the numerical values of ratios for angles from 0° to 360°.

# Targeted Worksheet 1

**Time: 60 minutes**

**Name:** **Surname:**

## Topic: Trigonometry

**This worksheet consists of 3 questions.**

## Instructions

**Read the following instructions carefully before answering the questions**

1. Answer ALL the questions.
2. Clearly show ALL calculations.
3. You may use a non-programmable scientific calculator.
4. Write neatly and legibly.

## Question 1: Point in a plane

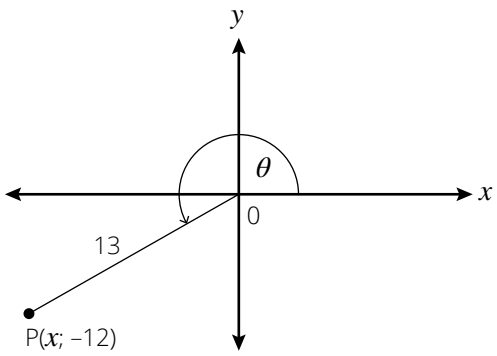
1.1 Given that $5 - 12\tan\theta = 0$ and $\theta$ is an acute angle, calculate the ratios:

1.1.1 $\sin\theta$ (3)

1.1.2 $\cos\theta$ (2)

1.1.3 $\sin\theta + \cos\theta$ (3)

1.2 In the diagram, P($x$; $-12$) is a point in the Cartesian plane.




With the aid of the above sketch, determine the value of:

1.2.1 $\tan\theta$ (3)

1.2.2 $2\sin\theta$ (2)

1.2.3 $\cos^2\theta$ (2)

## Targeted Worksheet 1

1.3 If $4\cos B - 5 = -2$ and $0° < B < 90°$, without the use of a calculator:

1.3.1 write down $\cos B = \ldots$ (1)

Make use of a diagram and calculate:

1.3.2 $\tan B$ (1)

1.3.3 $\sin(90° - B)$ (2)

1.3.4 $\frac{\tan B}{\sin B}$ (4)

**[23]**

## Question 2: Using special angles

2.1 Given that $A = 30°$ and $B = 140°$.

2.1.1 Calculate the value of $\sin(A + B) + \sin 3A$ (3)

2.2 Determine the value of the following without the use of a calculator:

2.2.1 $\frac{\cos 30° \times \sin 60° \times \tan 45°}{\frac{1}{4}\tan^2 60°}$ (5)

2.2.2 $\frac{1}{\sqrt{3}}\cos 30° + \cos 0° + \sin 90°$ (5)

**[13]**

## Question 3: Trigonometric equations

3.1 Solve for $x$:

3.1.1 $\frac{\tan x}{2} = 2{,}5$ (2)

3.1.2 $2\sin x = \sqrt{3}$ (3)

3.2 In each of the following equations, solve for $\theta$ where $0 \leq \theta \leq 90°$.

Give your answer correct to TWO decimal places.

3.2.1 $3 - 5\sin\theta = 0$ (3)

3.2.2 $\tan(3\theta - 18°) = 5$ (3)

3.2.3 $\frac{\cos\theta}{2} = 0{,}33$ (3)

**[14]**

**Total: [50]**

## Targeted Worksheet 2

# Topic: Functions: Parabola, Exponential and Hyperbola

## Content summary

The basic functions learners should know include:

- Parabola: $f(x) = x^2$
- Hyperbola: $f(x) = \frac{1}{x}$
- Exponential: $f(x) = b^x$
- The effects of $a$ and $q$ in: $y = af(x) + q$
- The concept of a function, where a certain quantity (output value) uniquely depends on another quantity (input value).
- Sketch graphs, find the equations of given graphs and interpret graphs.

## Question 1

- Tests the learners' ability to analyse different functions and determine the domain and range of that function, when given the equation and the graph.

## Question 2

- Tests the learners' ability to apply input values, understanding of function notation, when given the equation of certain graphs.

## Question 3

- Tests the learners' ability to answer functional questions based on observations of a given graph. This question shows two intersecting graphs (Parabola and line), learners are expected to analyse and interpret the graphs. In addition, learners should know what the $x$-values of the graph are when the two graphs are equal ($x$-coordinates of the points of intersection)

The following questions are examination type questions:

- Question 4: Exponential Graph
- Question 5: Parabola and line
- Question 6: Hyperbola

## Targeted Worksheet 2

**Time: 60 minutes**

**Name:** **Surname:**

# Topic: Functions: Parabola, Exponential and Hyperbola

**This worksheet consists of 6 questions.**

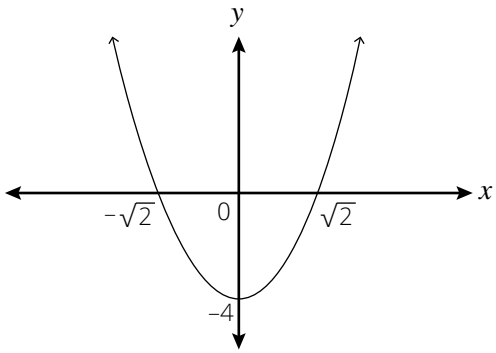
## Instructions

**Read the following instructions carefully before answering the questions**

1. Answer ALL the questions.
2. Clearly show ALL calculations.
3. You may use a non-programmable scientific calculator.
4. Write neatly and legibly.

## Question 1

1.1 Consider the function: $f(x) = 2x^2 - 4$.

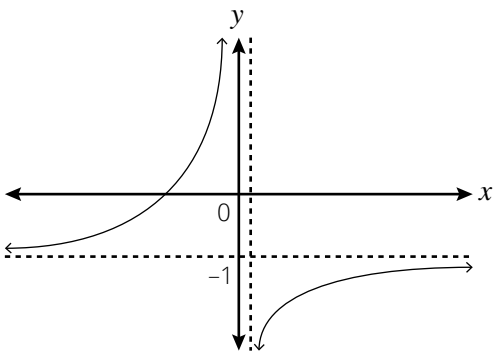



1.1.1 Write down the domain of the function. (2)

1.1.2 Write down the range of the function. (2)

## Targeted Worksheet 2

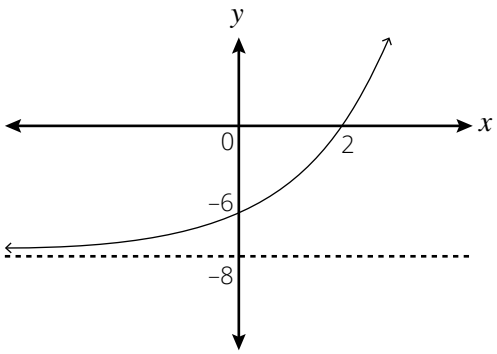
1.2 The diagram shows the graph of the function: $f(x) = -\frac{3}{x} - 1$.




1.2.1 Write down the domain of the function. (2)

1.2.2 Write down the range of the function. (2)

1.3 Consider the function: $f(x) = 2 \cdot 2^x - 8$.




1.3.1 Write down the domain of the function. (2)

1.3.2 Write down the range of the function. (2)

**[12]**

## Question 2

2.1 Given: $f(x) = 2x - 7$, $g(x) = \frac{2}{x+5}$ and $k(x) = x^2 - 2x + 7$. Calculate the following:

2.1.1 $f(10)$ (2)

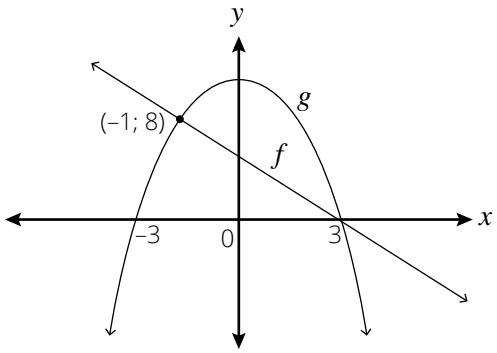
2.1.2 $k(-2) \cdot g(1)$ (4)

**[6]**

## Targeted Worksheet 2

## Question 3

3.1 Study the diagram below and answer the questions that follow.




Determine the value(s) of $x$ for which:

3.1.1 $f(x) > 0$ (2)

3.1.2 $g(x) \leq 0$ (2)

3.1.3 $f(x) \leq g(x)$ (2)

3.1.4 $g(x) - f(x) = 0$ (2)

**[8]**

## Question 4

4.1 Given: $h(x) = 2^x - 12$.

4.1.1 Write down the equation of the asymptote of $h$. (1)

4.1.2 Sketch the graph of $h$. (3)

4.1.3 If $m(x) = h(-x) - 3$, describe the transformation to obtain the graph $m$. (2)

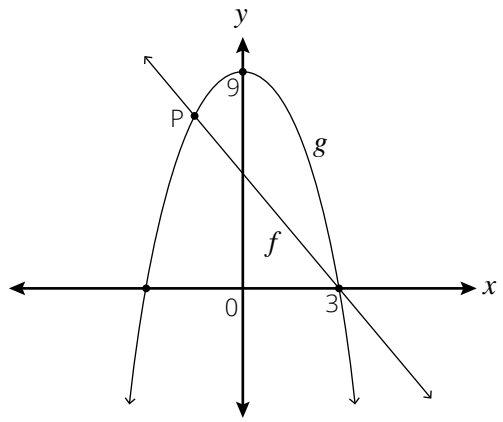
4.1.4 Give the range of $m(x)$. (2)

**[8]**

# Targeted Worksheet 2

## Question 5

The sketch below shows the graphs of $f(x) = -2x + 6$ and $g(x) = ax^2 + q$. Study the graphs and answer the questions that follow.




5.1 Determine the value of $a$ and $q$. (3)

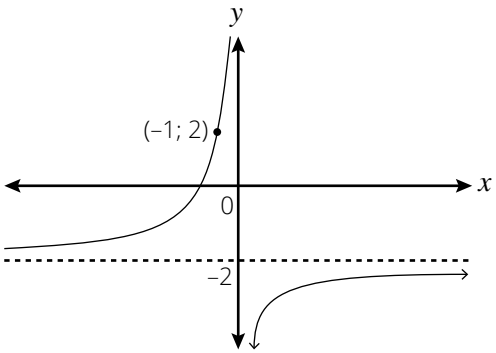
5.2 Write down the $x$-coordinate of $P$. (4)

5.3 Determine the values of $x$ for which $f(x) \geq g(x)$. (2)

**[9]**

## Question 6

Given: $p(x) = \frac{k}{x} + q$




6.1 Determine the values of $k$ and $q$. (3)

6.2 Write down the domain $p$. (2)

6.3 Determine the values of $x$ for which $p(x) > 0$. (2)

**[7]**

**Total: [50]**

**Targeted Worksheet 3**

# Topic: Analytical Geometry

## Content summary

Questions 1 – 3 test learners' ability to apply formulae for calculating the:

- Distance formulae
- Gradient of line between two points (and from that identify parallel and perpendicular lines)
- Coordinates of mid-point

### Question 1

- Tests the learners' ability to apply the distance formula. Finding the length of a line given two points, as well as finding coordinate points when given a length between two points.

### Question 2

- Tests the learners' ability to find the midpoint of a line segment, given two points on the line. Additionally, learners are expected to be able to calculate the endpoint of a line when given the midpoint.

### Question 3

- Tests the learners' ability to calculate parallel and perpendicular lines, prove parallel and perpendicular lines and determine coordinate points when given the gradient of collinear points.

### Questions 4 and 5

- Examination type questions - are integrated application questions involving distance, gradient and midpoint of a line segment. Learners are expected to know, and are tested on the properties of quadrilaterals and triangles.

# Targeted Worksheet 3

**Time: 60 minutes**

**Name:** **Surname:**

## Topic: Analytical Geometry

**This worksheet consists of 5 questions.**

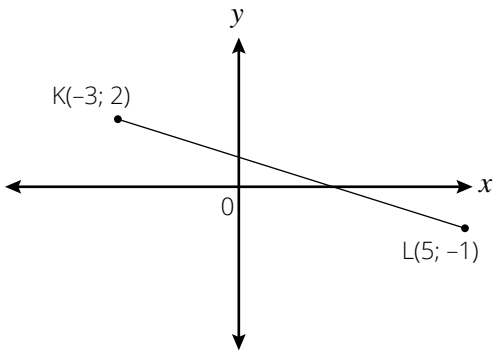
## Instructions

**Read the following instructions carefully before answering the questions**

1. Answer ALL the questions.
2. Clearly show ALL calculations.
3. You may use a non-programmable scientific calculator.
4. Write neatly and legibly.

## Question 1

1.1 In the diagram below, the line segment KL is drawn with K(−3; 2) and L(5; −1).




Determine the length of KL. (3)

1.2 Calculate the values of $x$ for which the points M( − 2; 1) and N($x$; −7) and are equidistant from P(1; −4). (6)

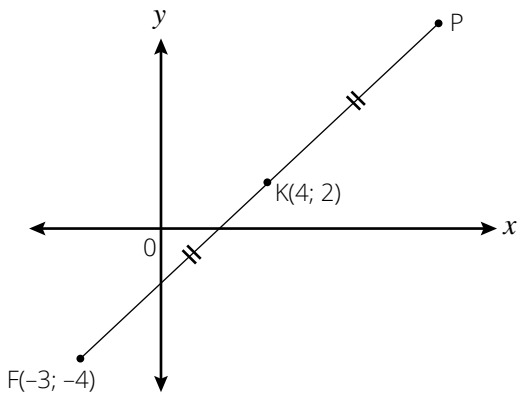
**[9]**

## Targeted Worksheet 3

## Question 2

2.1 Given M(−2; −1) and L(4; 5). Determine the coordinates of J, the midpoint of ML. (3)

2.2 In the diagram below, K(4; 2) is the midpoint of FP. Determine the coordinates of P. (4)




**[7]**

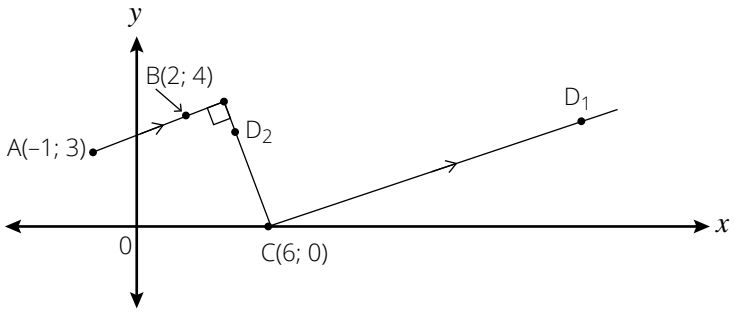
## Question 3

3.1 If A(−4; 8), B(−10; 0), C(6; −12) and D(12; −4) prove that:

3.1.1 AD ∥ BC (5)

3.1.2 AB ⊥ BC (4)

3.2 In the diagram below, the points A, B, C and D are given by A(−1; 3), B(2; 4), C(6; 0), $D_1(a; 4)$ and $D_2(b; 4)$.




3.2.1 If AB ∥ CD, determine the value of $a$. (4)

3.2.2 If AB ⊥ DC, determine the value of $b$. (4)

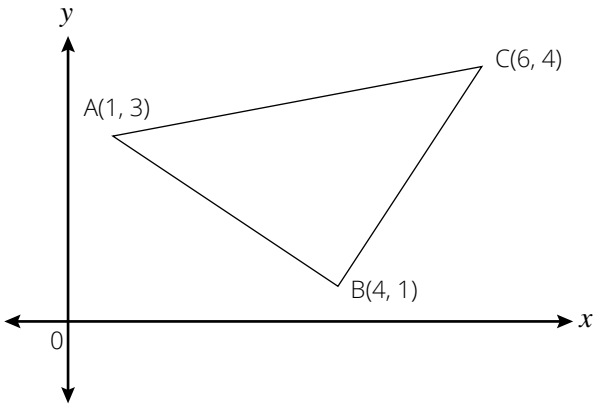
3.2.3 Show that A(−2; 3), B(0; 2) and C$\left(1; 1\frac{1}{2}\right)$ are collinear (lie on a straight line). (5)

**[22]**

# Targeted Worksheet 3

## Question 4

A(1; 3), B(4; 1) and C(6; 4) are three points in the Cartesian plane.




4.1 Calculate the length of AB and BC. (3)

4.2 What type of triangle is △ABC? (1)

4.3 Calculate the gradient of AB. (2)

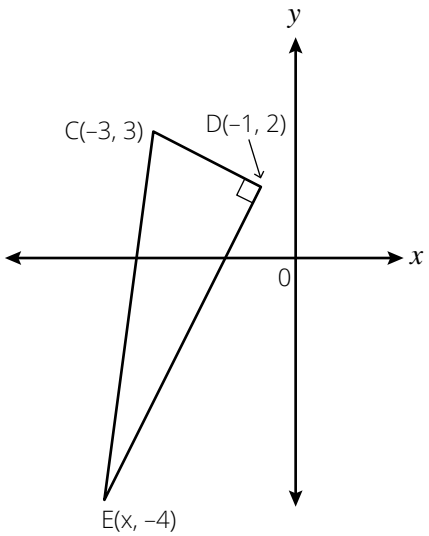
4.4 Show that the points A, B and D(7; −1) are collinear. (4)

4.5 Determine the coordinates of G if ABCG is a parallelogram. (2)

**[12]**

## Question 5

5.1 C(−3; 3), D(−1; 2) and E($x$; −4) are vertices of a triangle shown below. CD ⊥ DE.




5.1.1 Determine the gradient of CD. (2)

5.1.2 Determine the value of $x$. (4)

5.2 M$\left(-\frac{3}{2}; y\right)$ is the midpoint of a line segment AB. The coordinates of A and B are ($k$; −4) and (5; 10) respectively. Determine the values of $k$ and $y$. (4)

**[10]**

**Total: [60]**

## Targeted Worksheet 1 Answers

**Time: 60 minutes**

# Topic: Trigonometry

1.1.1 $\tan\theta = \frac{5}{12}$ ✓

Hypotenuse = 13 ✓

$\sin\theta = \frac{5}{13}$ ✓ (3)

1.1.2 $\cos\theta = \frac{12}{13}$ ✓✓ (2)

1.1.3 $\sin\theta + \cos\theta = \frac{5}{13}$ ✓ $+ \frac{12}{13}$ ✓ $= \frac{17}{13}$ ✓ (3)

1.2.1 $(13)^2 - (-12)^2 = (x)^2$ (Theorem of Pythagoras) ✓

$169 - 144 = (x)^2$

$25 = (x)^2$

$x = \pm 5$ units ✓

Choose $x = -5$

$\tan\theta = \left(\frac{-12}{-5}\right) = \frac{-12}{-5} = \frac{12}{5}$ ✓ (3)

1.2.2 $2\sin\theta = 2\left(\frac{-12}{13}\right)$ ✓ $= -\frac{24}{13}$ ✓ (2)

1.2.3 $\cos^2\theta = \left(-\frac{5}{13}\right)^2$ ✓ $= \frac{25}{169}$ ✓ (2)

1.3.1 $\cos B = \frac{3}{4}$ ✓ (1)

1.3.2 $\tan B = \frac{\sqrt{7}}{3}$ ✓ (1)

1.3.3 $90° - B$: 3rd angle in triangle

$\sin 90° - B = \cos B = \frac{3}{4}$ ✓✓ (2)

1.3.4 $\frac{\tan B}{\sin B} = \frac{\frac{\sin B}{\cos B}}{\sin B}$ ✓ $= \frac{1}{\cos B}$ ✓ $= \frac{4}{3}$ ✓✓ (4)

**[23]**

2.1.1 $\sin(30° + 140°) + \sin 3(30°) = \sin 170°$ ✓ $+ \sin 90°$ ✓ $= 1{,}17$ ✓ (3)

2.2.2 $\frac{\cos 30° \times \sin 60° \times \tan 45°}{\frac{1}{4}\tan^2 60°} = \frac{\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} \times 1}{\frac{1}{4} \times (\sqrt{3})^2} = 1$ ✓ (5)

2.2.3 $\frac{1}{\sqrt{3}}\cos 30° + \cos 0° + \sin 90° = \frac{1}{\sqrt{3}}\left(\frac{\sqrt{3}}{2}\right)$ ✓ $+ 1$ ✓ $+ 1$ ✓ $= \frac{1}{2} + 2$ ✓ $= 2\frac{1}{2}$ ✓ (5)

**[13]**

3.1.1 $\frac{\tan x}{2} = 2{,}5$

$\tan x = 5$ ✓

$x = 78{,}69°$ ✓ (2)

## Targeted Worksheet 1 Answers

3.1.2 $\sin x = \frac{\sqrt{3}}{2}$ ✓✓

$x = 60°$ ✓ (3)

3.2.1 $\sin\theta = \frac{3}{5}$ ✓

$\theta = \sin^{-1}\left(\frac{3}{5}\right)$ ✓

$\theta = 36{,}87°$ ✓ (3)

3.2.2 $3\theta - 18° = \tan^{-1}(5)$

$3\theta - 18° = 78{,}69°$ ✓

$3\theta = 96{,}69°$

$\theta = 32{,}23°$ ✓✓ (3)

3.2.3 $\cos\theta = 0{,}66$ ✓

$\theta = \cos^{-1} 0{,}66$ ✓

$\theta = 48{,}70°$ ✓ (3)

**[14]**

**Total: [50]**

## Targeted Worksheet 2 Answers

**Time: 60 minutes**

# Topic: Functions

1.1.1 Domain of the function: $x \in \mathbb{R}$ ✓✓ (2)

1.1.2 Range of the function: $y \in \mathbb{R}$: $y > -4$ ✓✓ (2)

1.2.1 Domain for the function: $x \in \mathbb{R}$: $x \neq 0$ ✓✓ (2)

1.2.2 Range of the function: $y \in \mathbb{R}$: $y \neq -1$ ✓✓ (2)

1.3.1 Domain: $x \in \mathbb{R}$ ✓✓ (2)

1.3.2 Range: $y \in \mathbb{R}$: $y > -8$ ✓✓ (2)

**[12]**

2.1.1 $f(10) = 2(10) - 7$ ✓

$f(10) = 13$ ✓ (2)

2.1.2 $k(-2) \cdot g(1) = -2^2 - 2(-2) + 7 \cdot \frac{2}{1+5}$ ✓✓

$= 15 \times \frac{1}{3}$ ✓ $= 5$ ✓ (4)

**[6]**

3.1 $x < 3$ ✓✓ (2)

3.2 $x \leq -3$ ✓ or $x \geq 3$ ✓ (2)

3.3 $-1$ ✓ $\leq x \leq 3$ ✓ (2)

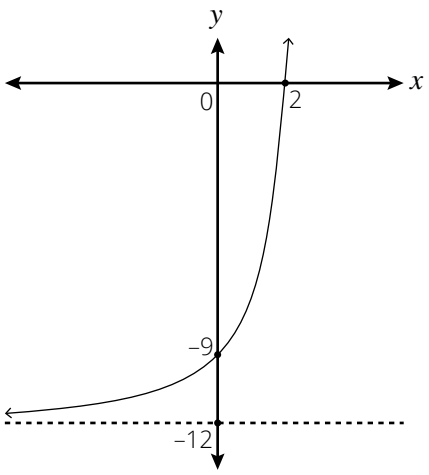
3.4 $g(x) = f(x)$ ✓

$x = -1$ or $x = 3$ ✓ (2)

**[8]**

4.1.1 $y = -12$ ✓ (1)

4.1.2




$x$-intercepts ✓

asymptote ✓

$y$-intercept ✓ (3)

4.1.3 The graph is reflected through the $y$-axis ✓ and translated 3 units down ✓ (2)

4.1.4 $y$ ✓ $> -15$ ✓ (2)

**[8]**

## Targeted Worksheet 2 Answers

5.1 $q = 9$ (by inspection) ✓

$f(x) = ax^2 + 9$

$0 = a(3)^2 + 9$ (substitute the point (3; 0)) ✓

$-9 = 9a$

$a = -1$ ✓ (3)

5.2 $f(x) = g(x)$

$-2x + 6 = -x^2 + 9$ ✓

$x^2 - 2x - 3 = 0$ ✓

$(x + 1)(x - 3) = 0$

$x = -1$ or $x = 3$ ✓

The $x$-coordinate of P is $-1$ ✓ (4)

5.3 $x \leq -1$ ✓ and $x \geq 3$ ✓ (2)

**[9]**

6.1 $q = -2$ (by inspection) ✓

substitute the point $(-1; 2)$ in $p(x) = \frac{k}{x} - 2$

$2 = \frac{k}{-1} - 2$ ✓

$k = -4$ ✓ (3)

6.2 $x \in \mathbb{R}$ ✓, $x \neq 0$ ✓ (2)

6.3 $x = -2$ ✓

$-2 < x < 0$ ✓ (2)

**[7]**

**Total: [50]**

## Targeted Worksheet 3 Answers

**Time: 60 minutes**

# Topic: Analytical Geometry

1.1 $d_{KL} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$= \sqrt{((-3) - (5))^2 + ((2) - (-1))^2}$ ✓
$= \sqrt{73}$ ✓ (2)

1.2 N$(x; -7)$ lies somewhere on the straight line $y = -7$ and PN = PM.
One point lies in the 3rd quadrant, $N_1$, and one point lies in the 4th quadrant $N_2$.
$x_1 < 0$ and $x_2 > 0$.
MP = PN
$MP^2 = PN^2$ ✓ (square both sides)
Using the distance formula: $(1 + 2)^2 + (-4 - 1)^2 = (x - 1)^2 + (-7 + 4)^2$ ✓
$9 + 25 = x^2 - 2x + 1 + 9$ ✓
$0 = x^2 - 2x - 24$ ✓
$0 = (x - 6)(x + 4)$ ✓
$x = 6$ or $x = -4$
$x_1 = -4$ and $x_2 = 6$ ✓ (6)

**[8]**

2.1 $J\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$
$J\left(\frac{(4) + (-2)}{2}; \frac{(5) + (-1)}{2}\right)$ ✓
J(1; 2) ✓ (2)

2.2 $M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right) = (x; y)$
$(x; y)$ is the midpoint
$K\left(\frac{(-3) + x_2}{2}; \frac{(-4) + y_2}{2}\right) = (4; 2)$ ✓
$\frac{-3 + x_2}{2} = 4$ ✓ and $\frac{-4 + y_2}{2} = 2$ ✓
$-3 + x_2 = 8$ and $-4 + y_2 = 4$
$x_2 = 11$ and $y_2 = 8$
P(11; 8) ✓ (4)

**[5]**

3.1.1 Two lines are parallel if their gradients are equal, $m_1 = m_2$.
$m = \frac{y_2 - y_1}{x_2 - x_1}$;
$m_{AD} = \frac{(-4) - (8)}{(12) - (-4)}$ ✓ $= -\frac{3}{4}$ ✓
$m_{BC} = \frac{(-12) - (0)}{(6) - (-10)}$ ✓ $= -\frac{3}{4}$ ✓
$m_{AD} = m_{BC}$
AD ∥ BC✓ (5)

## Targeted Worksheet 3 Answers

3.1.2 Two lines are perpendicular if the product of their gradients is equal to –1.

$m_{AB} = \frac{(0)-(8)}{(-10)-(-4)}$ ✓ $= \frac{4}{3}$ ✓

$m_{BC} = -\frac{3}{4}$

$m_{AB} \times m_{BC} = \frac{4}{3} \times -\frac{3}{4} = -1$ ✓

AB ⊥ BC ✓ (4)

3.2.1 $m_{AB} = m_{CD}$

$\frac{y_B - y_A}{x_B - x_A} = \frac{y_C - y_D}{x_C - x_D}$

$\frac{4-3}{2+1} = \frac{0-4}{6-x_D}$ ✓✓

$1 \times (6 - x_D) = -4 \times 3$ ✓

$x_D = 18 = a$

$D_1$ is the point (18; 4) ✓ (4)

3.2.2 $m_{AB} \times m_{CD} = -1$

$\frac{y_B - y_A}{x_B - x_A} \times \frac{y_C - y_D}{x_C - x_D} = -1$

$\left(\frac{4-3}{2+1}\right) \times \left(\frac{0-4}{6-x_D}\right)$ ✓ $= -1$ ✓

$\frac{1}{3} \times -4 = -6 + x_D$ ✓

$x_D = 4\frac{2}{3} = b$

$D_2$ is the point $\left(4\frac{2}{3}; 4\right)$ ✓ (4)

3.2.3 For the points to be collinear, the gradients of the line segments joining any two of the points must be equal.

$m_{AB} = \frac{(3)-(2)}{(-2)-(0)}$ ✓ $= -\frac{1}{2}$ ✓

$m_{BC} = \frac{(2)-\left(1\frac{1}{2}\right)}{(0)-(1)}$ ✓ $= -\frac{1}{2}$ ✓

therefore A, B and C are collinear. ✓ (5)

**[22]**

4.1 distance $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ ✓

$AB = \sqrt{(4-1)^2 + (1-3)^2}$

$AB = \sqrt{13}$ ✓

$BC = \sqrt{(6-4)^2 + (4-1)^2}$

$BC = \sqrt{13}$ ✓ (3)

4.2 isosceles triangle (1)

4.3 $m_{AB} = \frac{(1)-(3)}{(4)-(1)}$ ✓ $= -\frac{2}{3}$ ✓ (2)

## Targeted Worksheet 3 Answers

4.4 $m_{BD} = \frac{(1)-(-1)}{(4)-(7)}$ ✓ $= -\frac{2}{3}$ ✓

$m_{AB} = -\frac{2}{3}$ (proven in 4.3) ✓

$m_{AB} = m_{BD}$ ✓, therefore A, B and D are collinear. (4)

4.5 G(3 ✓; 6 ✓) (2)

**[12]**

5.1.1 $m_{CD} = \frac{(3)-(2)}{(-2)-(-1)}$ ✓ $= -\frac{1}{2}$ ✓ (2)

5.1.2 $m_{CD} \times m_{DE} = -1$, CD ⊥ DE

$-\frac{1}{2} \times \left(\frac{-4-2}{x-(-1)}\right)$ ✓ $= -1$ ✓

$-\frac{1}{2} \times -6 = -x - 1$ ✓

$x = -4$ ✓ (4)

5.2 $M\left(\frac{(k)+(5)}{2}; \frac{(-4)+y_2}{2}\right) = \left(-\frac{3}{2}; y\right)$ ✓

$\frac{k+5}{2} = -\frac{3}{2}$ and $\frac{-4+10}{2} = y$ ✓

$k + 5 = -3$ and $6y = 2$

$k = -8$ ✓ and $y = 3$ ✓ (4)

**[10]**

**Total: [60]**

# Exemplar Assessments

## Exemplar Assessments

**Time: 1 hour**

**Name:** **Surname:**

# Term 2: Control Test

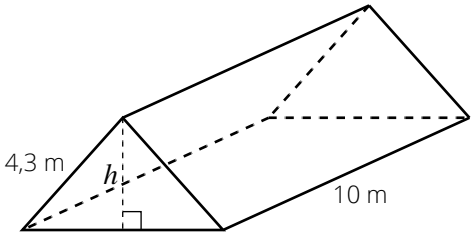
## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 4 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

1.1 A marquee has a rectangular base of 10 m by 4,3 m with an equilateral triangular cross-section and rectangular sides as shown below.

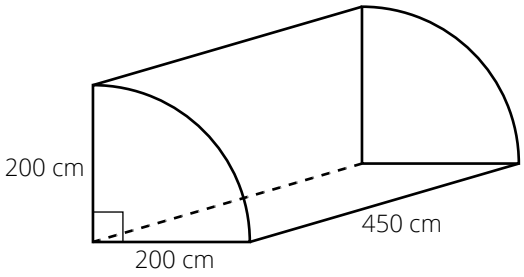



Calculate the area of the canvas needed to make the tent excluding the floor. (5)

1.2 The floor of the tent is to be covered with a green carpet. If the cost of the carpet is R25 per square metre, how much is required to do so? (4)

## Exemplar Assessments

1.3 A bus stop shelter is built in the shape shown below. The shelter has a circular cross-section of radius 200 cm and length of 450 cm.

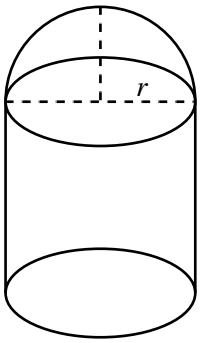



Calculate the area of material needed to construct the shelter in square metre. (6)

**[15]**

## Question 2

The diagram below shows a sketch of trash can made up of a hemisphere placed on top of a right cylinder with radius, $r$, and height 6,5 m. The volume of the cylinder is 250,15 m.




**Formulae:**

Surface area of sphere $= 4\pi r^2$

Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of cylinder $= 2\pi r^2 + 2\pi rh$

Volume of cylinder $= \pi r^2 h$

Calculate the following correct to TWO decimal places:

2.1 the radius of the cylinder. (3)

2.2 the volume of the trash can. (4)

2.3 the surface area of the trash can. (3)

**[10]**

## Question 3

Given: $f(x) = ax^2 + q$ and $f$ cuts the $x$-axis at points $(p - 5)$ and $(p + 1)$, where $p \in \mathbb{R}$. Determine:

3.1 the value of $p$. (2)

3.2 the values of $a$ and $q$ if it is also given that $f(-1) = 4$. (4)

3.3 Hence, sketch the graph of $f(x)$. (2)

**[8]**

## Question 4

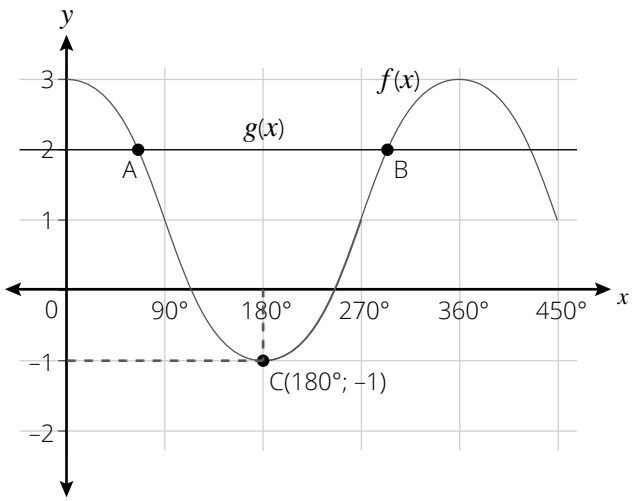
4.1 Consider the functions: $g(x) = 4\tan x$ and $f(x) = 4\sin x$.

4.1.1 Draw sketches of these functions for $0° \leq x \leq 360°$ clearly indicating: (5)

- the asymptotes if any
- all intercepts with the axes
- turning points if any
- the endpoints of both functions.

4.1.2 What are the values of $x$ for which $4\tan x = 4\sin x$? (3)

4.2 The diagram below shows two graphs of $f(x) = a\cos x + q$ and $g(x) = 2$ intersecting at A and B.




4.2.1 Determine the equation of $f(x)$. (5)

4.2.2 Determine the coordinates of A and B. (4)

**[17]**

**Total: [50]**

## Exemplar Assessments

**Time: 1 hour**

**Name:** **Surname:**

# Term 3: Control Test 1

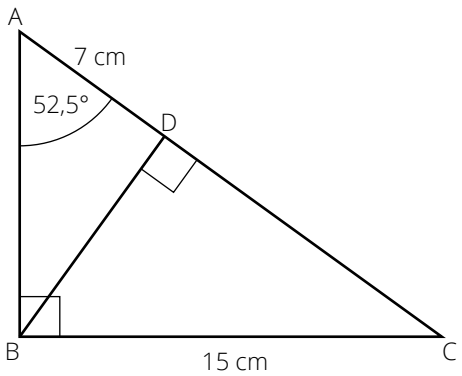
## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

1.1 In the diagram below, AD = 7 cm; BC = 15 cm; $B\hat{A}C = 52{,}5°$ and BD ⊥ AC. Use the diagram to calculate:

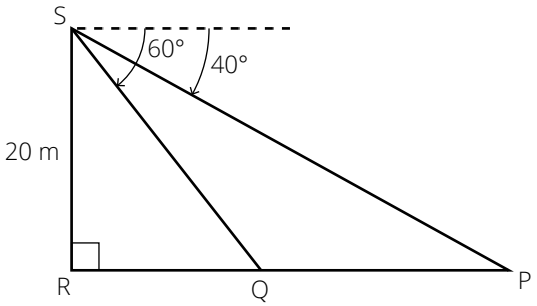



1.1.1 the length of BD. (2)

1.1.2 the length of CD. (2)

1.1.3 the size of $C\hat{B}D$. (2)

1.2 A man standing at the top of a cliff SR which is 20 m high, observes two speed boats P and Q approaching the cliff at angles of depression 40° and 60° respectively.

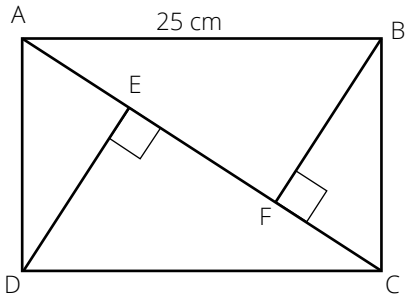



Calculate the distance between the speed boats at the time. (5)

**[11]**

## Question 2

An envelope is in the shape of a rectangle formed by two triangles ABC and ADC. The length of the rectangle AB = 25 cm and the diagonal AC = 30,52 cm. Two perpendiculars BF and DE to the line AC are dropped from the opposite vertices B and D respectively as shown below:




Calculate:

2.1 The length of BC. (3)

2.2 The size of angle BAC. (3)

2.3 The length of DE. (3)

2.4 The area of △ADC. (3)

**[12]**

## Question 3

The data below represents the marks obtained by 15 Grade 10 learners in a Mathematics test.

34; 54; 48; 62; 43; 52; 78; 68; 46; 90; 58; 84; 48; 73; 37

3.1 Calculate the mean mark. (2)

3.2 Determine the median mark. (2)

3.3 Determine the interquartile range. (3)

3.4 Draw a box-and-whisker diagram for the data. (3)

**[10]**

# Exemplar Assessments

## Question 4

The table below shows the distance in metres travelled by all the learners in Grade 10 at a certain school from their homes to school.

| Distance | Frequency |
|---|---|
| $1\,300 \leq d < 1\,400$ | 2 |
| $1\,400 \leq d < 1\,500$ | 3 |
| $1\,500 \leq d < 1\,600$ | 3 |
| $1\,600 \leq d < 1\,700$ | 5 |
| $1\,700 \leq d < 1\,800$ | 4 |
| $1\,800 \leq d < 1\,900$ | 5 |
| $1\,900 \leq d < 2\,000$ | 7 |

4.1 Determine the:

4.1.1 number of learners in Grade 10 at that school. (1)

4.1.2 estimated modal distance. (1)

4.1.3 average distance travelled. (3)

4.2 Calculate the percentage of learners that travel for:

4.2.1 less than 1 500 m (2)

4.2.2 more than 1 800 m. (2)

**[9]**

## Question 5

A survey was conducted among 45 Grade 10 learners at a certain school to establish how many learners had Smart phones (S) or Tablets (T) at school.

Results showed that:

- 33 learners had Smart phones,
- 25 learners had Tablets,
- 18 learners had both a Smart phone and a Tablet.

5.1 Use a Venn diagram to represent the above information. (4)

5.2 Calculate the probability that a learner chosen at random,

5.2.1 did not have a Smart phone or a Tablet. (1)

5.2.2 had a Tablet only. (1)

5.2.3 had a Smart phone or a Tablet. (2)

**[8]**

**Total: [50]**

## Exemplar Assessments

**Time: 1 hour**

**Name:** **Surname:**

# Term 3: Control Test 2

**This paper consists of 5 questions.**

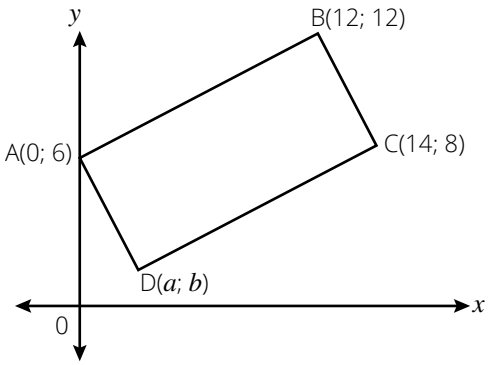
## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

In the diagram below, it is given that A(0; 6), B(12; 12), C(14; 8) and D($a$; $b$) are the vertices of a quadrilateral ABCD.




1.1 Find the length of BC. (2)

1.2 If the mid-point of BD is (7; 7), find the coordinates of D. (3)

1.3 Show that AC = BD. (4)

1.4 Show that AB is perpendicular to BC. (4)

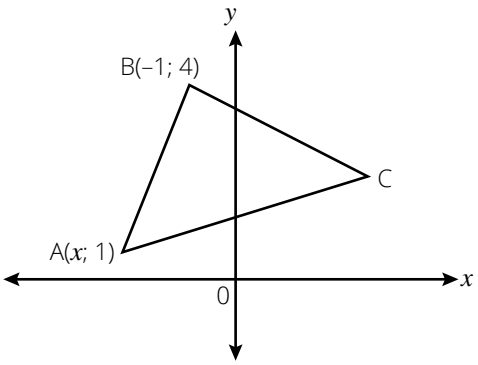
1.5 Identify the quadrilateral ABCD, giving reasons for your choice. (3)

**[16]**

# Exemplar Assessments

## Question 2

The points A($x$; 1), B(−1; 4), C and D are shown on the Cartesian plane below:




2.1 If the gradient of AB is 3, show that $x = -2$. (3)

2.2 If the gradient of AD is $\frac{1}{2}$, show that D is the point (0; 2). (2)

2.3 If D is the midpoint of AC, find the coordinates of C. (4)

2.4 Determine whether △ABC is equilateral, isosceles or scalene. Show all your working. (4)

**[13]**

## Question 3

3.1 A hardware store offers a discount of 10% on the first 20 bags of cement bought and a further 12% discount for every additional bag bought. How much did a customer pay for 50 bags of cement if the cost of each bag is R50? (3)

**[3]**

## Question 4

Karabo likes travelling. She has saved R25 000 for an air ticket and other expenses on her trip to Britain for a vacation at the end of 2021.

4.1 Use the table below of exchange rates to determine how many British pounds she can buy for R25 000. (2)

**SOUTH AFRICAN RAND RATES TABLE**

| Foreign Currency | Equivalent Value of R1 | Rand Equivalent of 1 Unit of Currency |
|---|---|---|
| US dollar | 0,066537 | 15,029313 |
| Euro | 0,057370 | 17,430570 |
| British pound | 0,046380 | 21,560961 |
| Australian dollar | 0,084634 | 11,815569 |

4.2. Karabo plans to make another trip to Germany at the end 2024.

4.2.1 Assume that the annual rate of inflation in South Africa will be 7,1% over the next 3 years. In 2024, what amount of money will be equivalent to the value of R25 000 now? (3)

4.2.2 Karabo plans to invest equal amounts of R14 350 into a savings account on 1 December 2022 and on 1 December 2023. If the account earns interest at 12% p.a. compounded annually, how much will she have in the account on the 1 December 2024 for her trip? (3)

**[8]**

## Question 5

A grandfather sold 10 tables for R15 000 which he invested in a savings bank to take his granddaughter to university. The money was invested on her second birthday and will only be available to his granddaughter on her 19th birthday. If the money is invested in a fixed deposit at a simple interest rate of 4% per annum:

5.1 find how much she will get when she turns 19 years. (3)

5.2 find the interest generated by the investment over the years. (2)

5.3 calculate the interest on the investment if it was made on compound interest terms. (5)

**[10]**

**Total: [50]**

## Exemplar Assessments

**Time: 1 hour**

**Name:** **Surname:**

# Term 4: Control Test

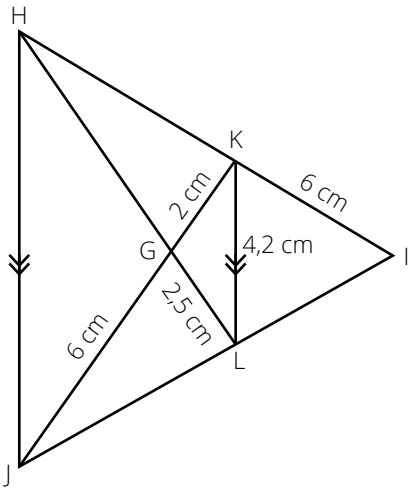
## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 4 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

In the diagram below, △HIJ has K and L on HI and JI such that KL ∥ HJ. G is the intersection of HL and KJ. KI = 6 cm, KL = 4,2 cm, GL = 2,5 cm, KG = 2 cm and GJ = 6 cm.



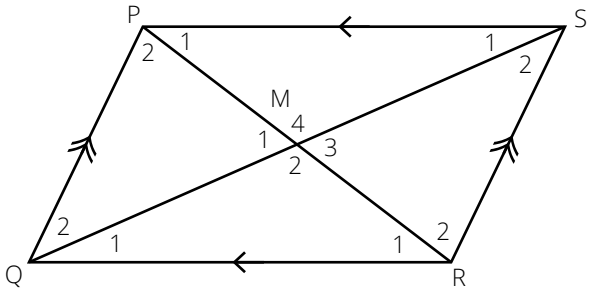

1.1 Prove that △HGJ ||| △LGK. (4)

1.2 Determine the length of HJ. (3)

**[7]**

## Question 2

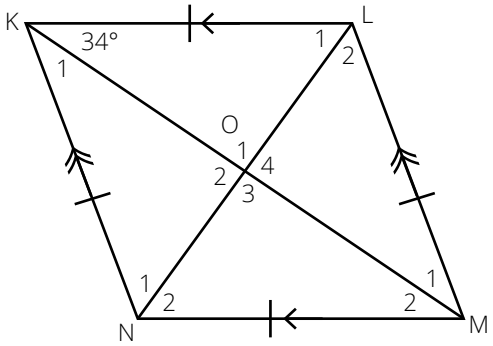
2.1 Use the sketch below to prove that:




2.1.1 The opposite sides of a parallelogram are equal in length. (6)

2.1.2 The diagonals of a parallelogram bisect each other. (5)

2.2 KLMN is a rhombus with diagonals intersecting at O. $L\widehat{K}M = 34°$.




2.2.1 Write down the size of $\widehat{O}_1$. (1)

2.2.2 Calculate giving reasons:

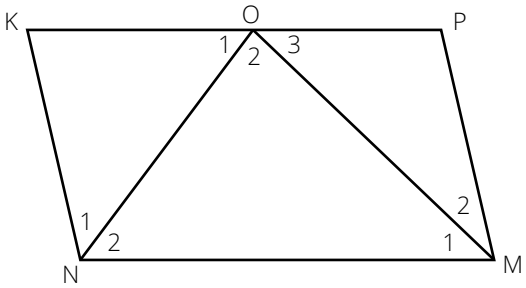
2.2.2.1. The size of $\widehat{L}_1$. (2)

2.2.2.2. The size of $K\widehat{N}M$. (3)

**[17]**

## Question 3

In the sketch below, KPMN is a parallelogram. ON bisects $K\widehat{N}M$ and OM bisects $N\widehat{M}P$.



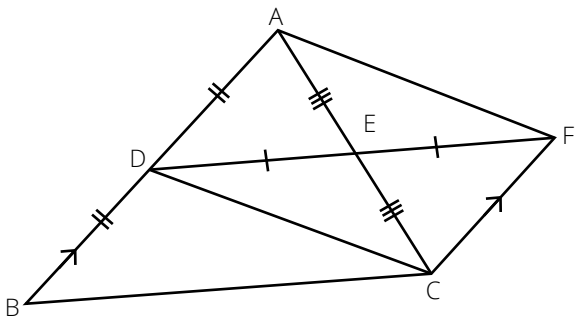

3.1 Show that $N\widehat{O}M = 90°$. (3)

3.2 Prove that O is the midpoint of KP. (5)

## Exemplar Assessments

**Time: 2 hours**

3.3 In the diagram below, D is the midpoint of △ABC. E is the midpoint of AC. DE is produced to F such that DE = EF. CF ∥ BA.




3.3.1 Write down a reason for which △ADE ≡ △CFE. (1)

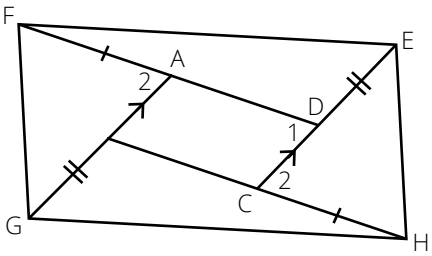
3.3.2 Write down a reason why DBCF is a parallelogram. (2)

3.3.3 Hence, prove the theorem which states that $DE = \frac{1}{2}BC$. (2)

**[13]**

## Question 4

ABCD is a parallelogram, DE = BG and AF = CH.




Prove that:

4.1 $\hat{A}_2 = \hat{C}_2$. (3)

4.2 EC = AG. (2)

4.3 FG = EH. (5)

4.4 EFGH is a parallelogram. (3)

**[13]**

**Total: [50]**

## Exemplar Assessments

**Time: 2 hours**

**Name:** **Surname:**

# Term 4: Examination Paper 1

## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 7 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

1.1 Factorise the following expressions fully:

1.1.1 $12x^3 - 3x$ (3)

1.1.2 $x^2 + 11x - 42$ (2)

1.1.3 $x - xy + y - 1$ (3)

1.1.4 $\frac{x^3 - 1}{x^2 + x + 1}$ (2)

1.2 Simplify the following:

1.2.1 $\frac{3^{x+1} - 3^{x-1}}{3^x}$ (3)

1.2.2 $\frac{12x^2 - 3}{2x^2 + x - 1} \div \frac{6x + 3}{x^2 + 2x + 1}$ (6)

**[19]**

## Question 2

2.1 Solve for $x$:

2.1.1 $x(x - 1) = 20$ (4)

2.1.2 $4^{x+1} - \frac{1}{64} = 0$ (4)

2.2 Solve simultaneously for $x$ and $y$:

$y + 2x + 10 = 0$ and $y = \frac{3x + 4}{4}$ (4)

**[12]**

# Exemplar Assessments

## Question 3

3.1 Given the linear number pattern: 8; 2; −4; ...

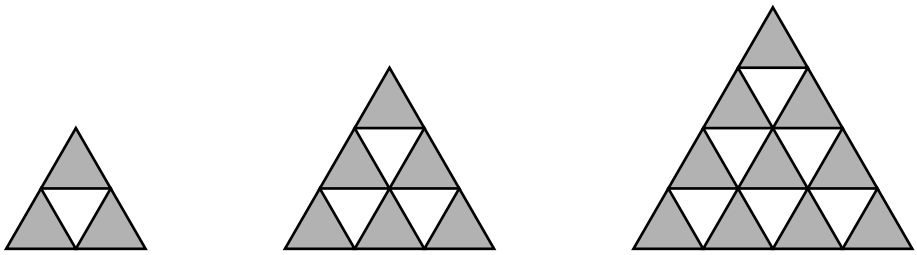
3.1.1 Write down the next two terms of the sequence. (2)

3.1.2 Determine the $n$th term of the sequence. (2)

3.1.3 Determine the 25th term of the sequence. (2)

3.1.4 Which term of the sequence will equal to −76? (2)

3.2 Thabo is investigating the number of white and dark tiles used to build the floor space of his room as represented by the patterns below.



Pattern 1 Pattern 2 Pattern 3

3.2.1 Draw the next pattern. (2)

3.2.2 Thabo discovered that the number of dark tiles required for each pattern was given by the following number sequence:

$T_1 = 3$

$T_2 = 3 + 3 = 6$

$T_3 = 3 + 3 + 4 = 10$

$T_4 = 3 + 3 + 4 + 5 = 15$

$T_5 = 3 + 3 + 4 + 5 + 6 = 21$

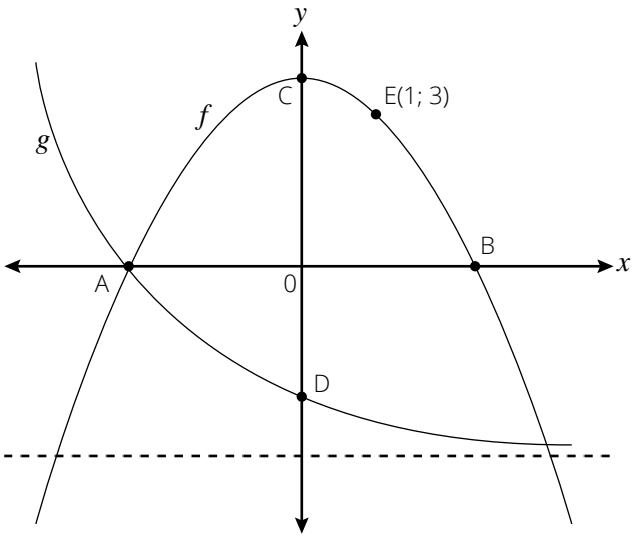
3.2.2.1. Use the sequence above to determine the number of dark tiles required to design the 7th pattern. (2)

3.2.2.2. How many tiles will be required altogether (white and dark) for the 7th pattern? (3)

**[15]**

## Question 4

Sketched below are the graphs of $f(x) = ax^2 + q$ and $g(x) = \frac{3}{2}\left(\frac{1}{2}\right)^x - 6$. A and B are the $x$-intercepts of $f$. The graphs intersect at A and point E(1; 3) lies on $f$. C is the turning point of $f$ and D is the $y$-intercept of $g$.




4.1 Write down the:

4.1.1 coordinates of D. (2)

4.1.2 equation of the asymptote of $g$. (1)

4.1.3 range of $g$. (1)

4.2 Calculate the:

4.2.1 coordinates of A. (2)

4.2.2 values of $a$ and $q$. (4)

4.3 Determine the:

4.3.1 length of CD. (2)

4.3.2 equation of the straight line through A and D. (3)

4.4 For which values of $x$ is:

4.4.1 $f(x) > 0$? (2)

4.4.2 $f$ decreasing? (1)

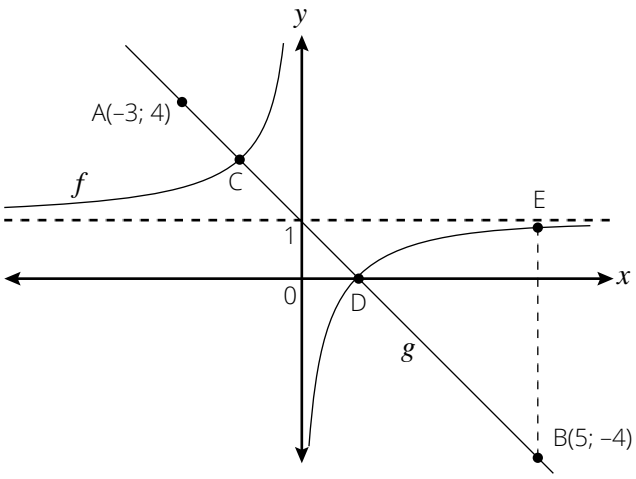
**[18]**

# Exemplar Assessments

**Time: 2 hours**

## Question 5

The sketch below shows $f$ and $g$, the graphs of $f(x) = -\frac{1}{x} + 1$ and $g(x) = ax + q$ respectively. Points A(−3; 4) and B(5; −4) lie on the graph of $g$. The two graphs intersect at points C and D. Line BE is drawn parallel to the $y$-axis, with E on $f$.




5.1 Show that $a = -1$ and $q = 1$. (2)

5.2 Determine the value of $x$ for which $f(x) = g(x)$. (4)

5.3 For what values of $x$ is $g(x) > f(x)$? (3)

5.4 Calculate the length of BE. (3)

5.5 Write down an equation of $h$ if $h(x) = f(x) + 3$. (1)

**[13]**

## Question 6

6.1 Calculate the interest rate on the amount R8 000 if it triples after 3 years at a compound interest. (3)

6.2 The cash price of an item is R5 000. Sibusiso wants to buy the item using a hire purchase agreement. He has to pay a deposit of 10% and pay the balance in 36 monthly instalments at a simple interest of 8% p.a. Calculate:

6.2.1 The monthly instalments he pays. (5)

6.2.2 The total interest he pays. (2)

6.3 The cost of a shirt at a certain retail outlet is about R950. What would be the price of 4 such shirts in USD if 1USD = R13,44? (3)

**[13]**

## Question 7

7.1 Mr Smith lives in a block of 90 apartments labelled from 01 up to 90. You are not sure what number his flat is, so you do not know which number to ring at the front gate.

7.1.1 What is the probability of getting either Mr Smith's flat or one of his immediate neighbours, if you ring a number at random? (2)

7.1.2 You have remembered that his flat number has a 9 in it. What is the probability that you will be able to guess his flat number by considering this information? (2)

7.2 On a particular day, 150 learners visited the school tuck shop. These learners were interviewed to find out what they bought.

- 125 learners had bought pies.
- 85 learners had bought muffins.
- 70 learners had bought both pies and muffins.

7.2.1 Draw a Venn diagram to represent the above information. (4)

7.2.2 What is the probability that a learner chosen at random had bought the following:

7.2.2.1 pies but not muffins? (1)

7.2.2.2 neither pies nor muffins? (1)

**[10]**

**[100]**

## Exemplar Assessments

**Time: 2 hours**

**Name:** **Surname:**

# Term 4: Examination Paper 2

## Instructions

**Read the following instructions carefully before answering the questions.**

1. This question paper consists of 8 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

## Question 1

The time taken, in minutes, to complete a 5 km race by a group of 13 learners is given below:

19; 21; 16; 22; 27; 20; 25; 34; 19; 22; 13; 30; 22

1.1 Identify the median time taken by the runners to complete the 5 km race. (2)

1.2 Determine:

1.2.1 the mean time. (3)

1.2.2 the range. (1)

1.2.3 the interquartile range. (3)

1.3 Draw a box-and-whisker plot to represent the data. (3)

**[12]**

## Question 2

The weights of 45 boys are distributed as shown in the table below.

| Weight $w$ (kg) | Number of boys |
|---|---|
| $40 < w \leq 50$ | 6 |
| $50 < w \leq 60$ | 10 |
| $60 < w \leq 70$ | 15 |
| $70 < w \leq 80$ | $x$ |
| $80 < w \leq 90$ | 3 |

2.1. Determine the value of $x$. (1)

2.2 Write down the modal class of the data. (1)

2.3 Estimate the mean weight of the boys. (3)

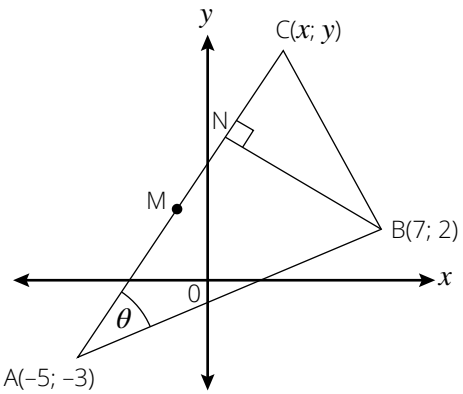
**[5]**

## Question 3

3.1 Show that the quadrilateral bounded by the lines:

$y = 2x + 1$; $y - 3x = 6$; $y + 3x = 2$ and $y = 3x + 1$ is a trapezium. (4)

3.2 In the diagram below, ABC is a triangle in the Cartesian plane with vertices A$(-5; -3)$, B$(7; 2)$ and C$(x; y)$. BN $\perp$ CA and M$(-1; 3)$ is the midpoint of AC.




3.2.1 Show that $x = 3$ and $y = 9$ are the coordinates of C. (2)

3.2.2 Calculate the gradient of AC. (2)

3.2.3 Hence, determine the equation of BN. (3)

3.2.4 Calculate the length of the line AC. (Leave your answer in surd form). (2)

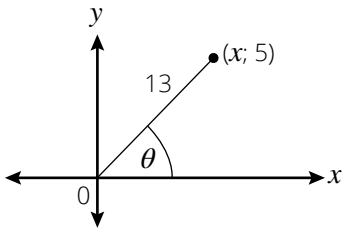
3.2.5 Calculate the area of $\triangle$ABC if the length of the line BN $= 2\sqrt{13}$ units. (3)

**[16]**

# Exemplar Assessments

## Question 4

4.1




Determine WITHOUT the use of a calculator:

4.1.1 the value of $x$. (3)

4.1.2 $\tan\theta$ (3)

4.1.3 $\cos^2\theta - 2\sin^2\theta$ (3)

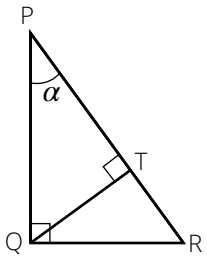
4.2 Simplify without using a calculator:

$$\frac{\sin 90° \cdot \sin 90° + \tan 45° \cdot \cos 60°}{\tan 45° \cdot \sin 90°}$$ (7)

**[17]**

## Question 5

5.1 In the diagram below, $\triangle PQR$ is right-angled. QT $\perp$ PR and $T\hat{P}Q = \alpha$.




5.1.1 Use PQ, QR, QT, TR, PT or PR to write down the following:

5.1.1.1 any two possible ratios of $\cos\alpha$. (2)

5.1.1.2 all the possible ratios of $\tan\alpha$. (2)

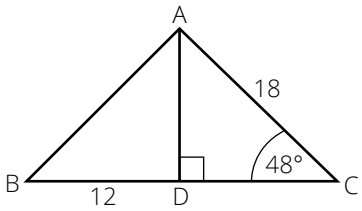
5.1.2 If it is given that TP = 5 and $\alpha = 40°$, calculate the numerical value of QT. (3)

5.2 In triangle PQT, $\hat{P} = 30°$ and $\hat{Q} = 60°$. Calculate the value of 2 sin P + cos 3Q. (3)

**[10]**

## Question 6

6.1 In the figure below, AD ⊥ BC, AC is 18 units, $\widehat{C} = 48°$ and BD = 12 units.

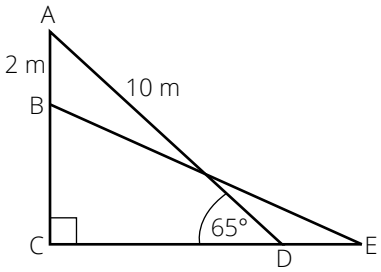



Determine, correct to two decimal places:

6.1.1 The length of AD. (3)

6.1.2 The magnitude of $\widehat{B}$. (3)

6.2 A painter is standing on a ladder, 10 m in length, which is leaning against a wall. The angle between the ladder and the ground is 65°.




6.2.1 At what height is the top of the ladder above the ground? (2)

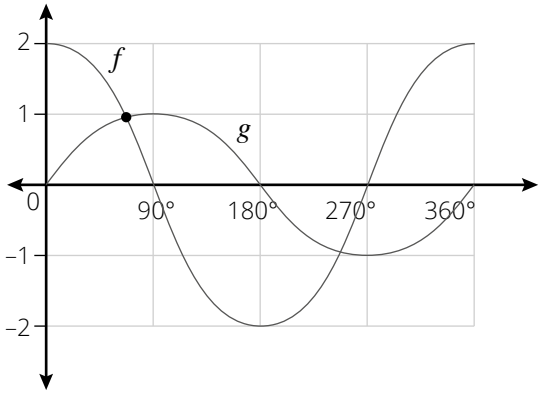
6.2.2 If the painter lowers the ladder by 2 m, what will be the size of the angle between the ladder and the ground? (3)

**[11]**

# Exemplar Assessments

## Question 7

The graph of $f(x) = 2\cos x$ and $g$ are shown for $x \in [0°; 360°]$.




7.1 Find the equation of $g$. (1)

7.2 Write down:

7.2.1 the period of $g$. (1)

7.2.2 the amplitude of $g$. (1)

7.3 Write down the minimum value of $f(x) - 1$. (1)

7.4 Use the graph to determine for which value(s) of $x$ will $f(x) \cdot g(x) > 0$. (2)

7.5 The graph of $f$ is moved 3 units downwards to form the graph of $h$. Determine:

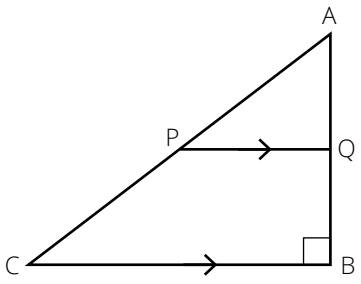
7.5.1 the equation of $h$. (2)

7.5.2 the range of $h$ for the interval $0° \leq x \leq 360°$. (2)

**[10]**

## Question 8

8.1 In the diagram, ABC is a right-angled triangle. PQ ∥ CB and P is the midpoint of AC.

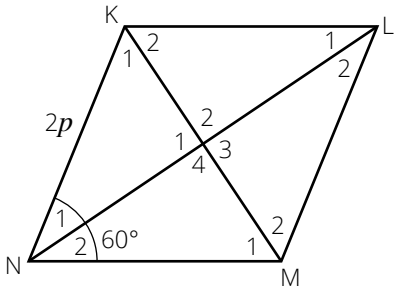



8.1.1 Prove that PQ ⊥ AB. (3)

8.1.2 Prove that Q is the midpoint of AB. (2)

8.1.3 Prove that PB = PA = $\frac{1}{2}$AC. (3)

8.2 In the diagram below, KLMN is a rhombus such that KNM = 60° and KN = $2p$ units. The diagonals intersect at O.

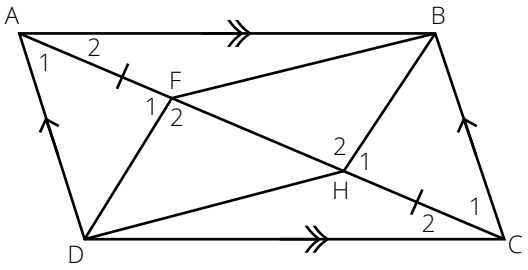



8.2.1 Write down a reason why $\widehat{O}_1 = 90°$. (1)

8.2.2 Prove that KNM is an equilateral triangle. (3)

8.2.3 Calculate the length of LN in terms of $p$. (3)

8.3 Below is a parallelogram ABCD with diagonal AC. AF = HC.




Show that △AFD ≡ △CHB. (4)

**[19]**

**Total: [100]**

## Exemplar Assessments Memorandum

# Term 2: Control Test

1.1 $h = \sqrt{4{,}3^2 - 2{,}15^2}$ ✓

$h = 3{,}72$ m ✓

Total surface area $= 2(10 \times 4{,}3)$ ✓ $+ 2\left(\frac{1}{2} \times 4{,}3 \times 3{,}72\right)$ ✓ $= 102{,}00\ m^2$ ✓ (5)

1.2 Floor area $= 10 \times 4{,}3$ ✓ $= 43\ m^2$ ✓

Cost $= 25 \times 43$ ✓ $=$ R1 075 ✓ (4)

1.3 Arc length $= \frac{1}{4} \times 2\pi \times 200$ ✓ $= 314{,}16$ cm ✓

Total surface area $= 2\left(\frac{1}{4} \times \pi \times 2^2\right)$ ✓ $+ 2(4{,}5 \times 2)$ ✓ $+ (3{,}1416 \times 4{,}5)$ ✓

Total surface area $= 38{,}42\ m^2$ ✓ (6)

**[15]**

2.1 $V = \pi r^2 h$

$250{,}15 = \pi r^2 \times 6{,}5$ ✓

$r = \sqrt{\frac{250{,}15}{6{,}5\pi}}$ ✓ $= 3{,}5$ ✓ (3)

2.2 Volume of hemisphere: $V = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$ ✓

$V = \frac{2}{3}\pi(3{,}5)^3$ ✓ $= 89{,}80$ ✓

Total volume $= 250{,}15 + 89{,}80 = 339{,}95$ ✓ (4)

2.3 Total surface area $= 2\pi r^2 + \pi r^2 + 2\pi rh$ ✓ $= 3\pi r^2 + 2\pi rh$

Total surface area $= 3\pi(3{,}5)^2 + 2\pi \times 3{,}5 \times 6{,}5$ ✓ $= 258{,}40$ ✓ (3)

**[10]**

3.1 Axis of symmetry: $x = 0$

$\frac{(p-5)+(p+1)}{2} = 0$ ✓

$2p - 4 = 0$

$p = 2$ ✓ (2)

3.2 $x_1 = -3; x_2 = 3$

$f(-3) = a(-3)^2 + q = 0$ ✓

$9a + q = 0$ ①

$f(-1) = a(-1)^2 + q = 4$ ✓

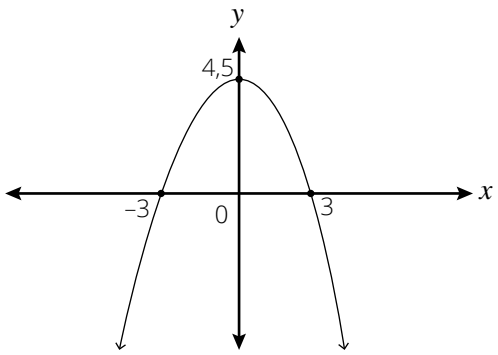
$a + q = 4$ ②

① − ②: $8a = -4$

$a = -\frac{1}{2}$ ✓

$q = \frac{9}{2}$ ✓ (4)

3.3

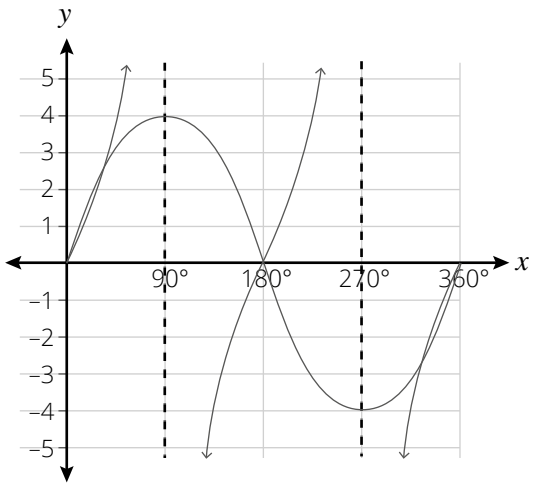



✓ correct shape

✓ correct intercepts (2)

**[8]**

4.1.1




✓ Intercepts of $f(x)$

✓ Turning point of $f(x)$

✓ Shape of $f(x)$

✓ Asymptotes of $g(x)$

✓ Shape of $g(x)$

(5)

4.1.2 $x = 0°$ ✓$x = 180°$ ✓$x = 360°$ ✓ (3)

4.2 $f(x) = a\cos x + q$ and $g(x) = 2$

4.2.1 $3 = a\cos 0° + q$ ✓

$3 = a + q$ ①

$-1 = a\cos 180° + q$ ✓

$-1 = -a + q$ ②

$2 = 2q$

$q = 1$; ✓ $a = 2$ ✓

$f(x) = 2\cos x + 1$ ✓ (5)

4.2.2 $2 = 2\cos x + 1$ ✓

$\cos x = \frac{1}{2}$ ✓

$x = 60°$; $x = 300°$ ✓

A(60°; 2) ✓ and B(300°; 2) ✓ (4)

**[17]**

**Total: [50]**

## Exemplar Assessments Memorandum

# Term 3: Control Test 1

1.1.1 $\tan 52{,}5° = \frac{BD}{7}$ ✓

$BD = 7 \tan 52{,}5° = 9{,}12$ cm ✓ (2)

1.1.2 $CD = \sqrt{15^2 - 9{,}12^2}$ ✓ $= 11{,}91$ cm ✓ (2)

1.1.3 $\hat{C} = 37{,}5°$ ✓

$C\hat{B}D = 90° - 35° = 52{,}5°$ ✓ (2)

1.2 $\hat{P} = 40°$

$\tan 40° = \frac{20}{PR}$ ✓

$PR = 23{,}84$ m ✓

$S\hat{Q}R = 60°$

$\tan 60° = \frac{20}{RQ}$ ✓

$RQ = 11{,}55$ m ✓

$PQ = 23{,}84 - 11{,}55 = 12{,}29$ m ✓ (5)

**[11]**

2.1 $AB^2 + BC^2 = AC^2$ ✓

$BC = \sqrt{30{,}52^2 - 25^2}$ ✓ $= 17{,}51$ ✓ (3)

2.2 $\tan(B\hat{A}C) = \frac{BC}{AB}$ ✓ $= \frac{17{,}51}{25}$ ✓

$B\hat{A}C = 35°$ ✓ (3)

2.3 $A\hat{C}D = 35°$ ✓

$\sin 35° = \frac{DE}{25}$ ✓

$DE = 14{,}34$ cm ✓ (3)

2.4 Area $\triangle ACD = \frac{1}{2}bh$ ✓

Area $\triangle ACD = \frac{1}{2} \times 25 \times 17{,}51$ ✓ $= 218{,}875$ cm$^2$ ✓ (3)

**[12]**

3.1 $\bar{x} = \frac{\sum x}{n}$

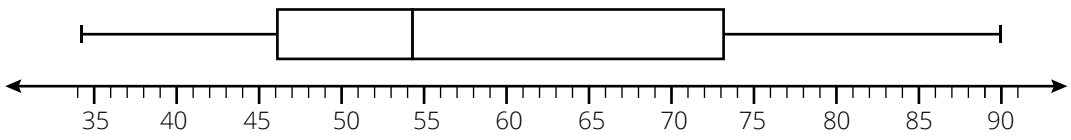
$\bar{x} = \frac{875}{15}$ ✓ $= 58{,}33$ ✓ (2)

3.2 34; 37; 43; 46; 48; 48; 52; 54; 58; 62; 68; 73; 78; 84; 90 ✓ For arranging in ascending order.

median = 54 ✓ (2)

3.3 $Q_1 = 46$ ✓; $Q_3 = 73$ ✓; $IQR = 73 - 46 = 27$ ✓ (3)

3.4




✓ For min and max; ✓ For median; ✓ For $Q_1$ and $Q_3$ (3)

## Exemplar Assessments Memorandum

**[10]**

4.1.1 29 ✓ (1)

4.1.2 1 950 m ✓ (1)

4.1.3 $\bar{x} = \frac{\sum(f.x)}{n}$

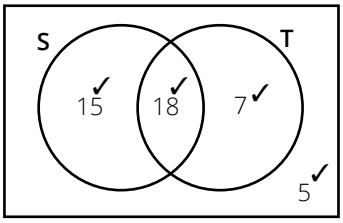
$\bar{x} = \frac{49\,850}{29} = 1\,718{,}97$ m ✓ (3)

4.2.1 $\frac{5}{29} \times 100$ ✓ = 17,24% ✓ (2)

4.2.2 $\frac{12}{29} \times 100$ ✓ = 41,38% ✓ (2)

**[9]**

5.1 (4)




5.2.1 Did not have a Smart phone or a Tablet: $\frac{5}{45} = \frac{1}{9}$ ✓ (1)

5.2.2 Had a Tablet only: $\frac{7}{45}$ ✓ (1)

5.2.3 Had a Smart phone or a Tablet: 15 + 18 + 7 = 40 ✓

$\frac{40}{45} = \frac{8}{9}$ ✓ (2)

**[8]**

**Total: [50]**

## Exemplar Assessments Memorandum

# Term 3: Control Test 2

1.1 $BC = \sqrt{(12-14)^2 + (12-8)^2}$ ✓ $= 4{,}47$ ✓ (2)

1.2 $\frac{a+12}{2} = 7; \frac{b+12}{2} = 7$ ✓

$a = 2;$ ✓ $b = 2$ ✓ (3)

1.3 $AC = \sqrt{(14-0)^2 + (8-6)^2}$ ✓ $= 14{,}14$ ✓

$BD = \sqrt{(12-2)^2 + (12-2)^2}$ ✓ $= 14{,}14$ ✓

$AC = BD$ (4)

1.4 $m_{AB} = \frac{12-6}{12-0} = \frac{1}{2}$ ✓✓

$m_{BC} = \frac{12-8}{12-14} = -2$ ✓

$m_{AB} \times m_{BC} = \frac{1}{2} \times -2 = -1$ ✓

$AB \perp BC$ (4)

1.5 Rectangle ✓

Diagonals are equal ✓

Interior angles are 90° ✓ (3)

**[16]**

2.1 $m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓

$3 = \frac{1-4}{x+1}$ ✓

$3x + 3 = -3$

$3x = -6$ ✓

$x = -2$ (3)

2.2 $m_{AD} = \frac{1-2}{-2-0}$ ✓

$m_{AD} = -\frac{1}{-2} = \frac{1}{2}$ ✓

Therefore, D is (0; 2). (2)

2.3 $x_D = \frac{x-2}{2} = 0$ ✓and $y_D = \frac{y+1}{2} = 2$ ✓

$x = 2;$ ✓ $y = 3$ ✓

C(2; 3) (4)

2.4 $AB = \sqrt{(-2+1)^2 + (1-4)^2} = \sqrt{10}$ ✓

$AC = \sqrt{(2+2)^2 + (3-1)^2} = 2\sqrt{5}$ ✓

$BC = \sqrt{(2+1)^2 + (3-4)^2} = \sqrt{10}$ ✓

$\triangle ABC$ is isosceles. ✓ (4)

**[13]**

3.1 Total cost $= \left(\frac{90}{100} \times 20 \times 50\right)$ ✓$+ \left(\frac{88}{100} \times 30 \times 50\right)$ ✓ $=$ R 2 220 ✓ (3)

**[3]**

## Exemplar Assessments Memorandum

4.1 British pounds = 25 000 × 0,046380 ✓ = £1 159,50 ✓ (2)

4.2.1 $A = P(1 + i)^n$ ✓

$A = 25\,000\,(1 + 0{,}071)^3$ ✓ = R30 712,02 ✓ (3)

4.2.2 $A = P(1 + i)^n$

$A = 14\,350(1 + 0{,}12)^2$ ✓ + 14 350(1 + 0,12) ✓ = R34 072,64 ✓ (3)

**[8]**

5.1 $A = P(1 + i.n)$ ✓

$A = 15\,000(1 + 0{,}04 \times 17)$ ✓ = 25 200 ✓ (3)

5.2 $I = 25\,200 - 15\,000$ ✓ = 10 200 ✓ (2)

5.3 $A = P\,(1 + i)^n$ ✓

$A = 15\,000\,(1 + 0{,}04)^{17}$ ✓ = 29 218,51 ✓

$I = 29\,218{,}51 - 15\,000$ ✓ = 14 218,51 ✓ (5)

**[10]**

**Total: [50]**

## Exemplar Assessments Memorandum

# Term 4: Control Test

| | | | |
|---|---|---|---|
| 1.1 | $\angle HJG = \angle LKG$ | (alt. $\angle$s; HJ $\parallel$ KL) ✓ | |
| | $\angle JHG = \angle KLG$ | (alt. $\angle$s; HJ $\parallel$ KL) ✓ | |
| | $\angle HGJ = \angle KGL$ | (vert. opp. $\angle$s =) ✓ | |
| | $\triangle HGJ \,|||\, \triangle LGK$ | (AAA) ✓ | (4) |
| 1.2 | $\frac{HJ}{KL} = \frac{HG}{LG} = \frac{GJ}{GK}$ | ($|||$ $\triangle$s) ✓ | |
| | $\frac{HJ}{4,2} = \frac{6}{2}$ ✓ | | |
| | HJ = 12,6 ✓ | | (3) |
| | | | **[7]** |
| 2.1.1 | $\hat{S}_1 = \hat{Q}_1$ | (alt. $\angle$s; PS $\parallel$ QR) ✓ | |
| | $\hat{S}_2 = \hat{Q}_2$ | (alt. $\angle$s; PQ $\parallel$ SR) ✓ | |
| | SQ = SQ | (common) ✓ | |
| | $\triangle PSQ \equiv \triangle QRS$ | (AAS) ✓ | |
| | PS = QR | ($\equiv$ $\triangle$s) ✓ | |
| | PQ = SR | ($\equiv$ $\triangle$s) ✓ | (6) |
| 2.1.2 | $\hat{S}_1 = \hat{Q}_1$ | (alt. $\angle$s; PS $\parallel$ QR) ✓ | |
| | $\hat{P}_1 = \hat{R}_1$ | (alt. $\angle$s; PS $\parallel$ QR) ✓ | |
| | PS = QR | (opp. sides of parm.) ✓ | |
| | $\triangle PSM \equiv \triangle QRM$ | (AAS) ✓ | |
| | PM = MR and QM = MS | ($\equiv$ $\triangle$s) ✓ | |
| 2.2.1 | 90° ✓ | | (1) |
| 2.2.2.1 | $\hat{L}_2 = 56°$ ✓ | (diagonals of a rhombus bisect int. $\angle$s) ✓ | (2) |
| 2.2.2.2 | $K\hat{N}M = 112°$ ✓ | (opp. $\angle$s of parm.) ✓ | (2) |
| | | | **[17]** |
| 3.1 | Let $\hat{N}_1 = \hat{N}_2 = x$ and $\hat{M}_1 = \hat{M}_2 = y$ | | |
| | $K\hat{N}M + N\hat{M}P = 180°$ | (co-int. $\angle$s; KN $\parallel$ PM) ✓ | |
| | | $2x + 2y = 180°$ | |
| | | $x + y = 90°$ ✓ | |
| | $N\hat{O}M = 90°$ | ($\angle$ sum of $\triangle$) ✓ | (3) |

## Exemplar Assessments Memorandum

| | | | |
|---|---|---|---|
| 3.2 | $\hat{O}_1 = \hat{N}_2$ | (alt. ∠s; KP ∥ NM) ✓ | |
| | $\hat{O}_1 = \hat{N}_1$ | (given) | |
| | $\hat{O}_3 = \hat{M}_1$ | (alt. ∠s; KP ∥ NM) ✓ | |
| | $\hat{O}_3 = \hat{M}_2$ | (given) | |
| | KO = KN | (sides opp.=∠s) ✓ | |
| | KO = PM | (opp. sides of parm.) ✓ | |
| | KO = OP | (sides opp.=∠s) ✓ | (5) |
| 3.3.1 | SAS ✓ | | (1) |
| 3.3.2 | CF = DA | (≡ △s) ✓ | |
| | DBCF is a parallelogram | (pair of opp. sides = and ∥) ✓ | (2) |
| 3.3.3 | 2DE = BC ✓ | (opp. sides of parm) ✓ | |
| | $DE = \frac{1}{2}BC$ | | (2) |
| | | | **[13]** |
| 4.1 | $\hat{A}_2 = \hat{D}_1$ ✓ | (corr. ∠s; AD ∥ BC) ✓ | |
| | $= \hat{C}_2$ | (alt. ∠s; AD ∥ BC) ✓ | (3) |
| 4.2 | BG = DE | (given) | |
| | AB = DC | (opp. sides of parm) ✓ | |
| | AB + BG = DC + DE ✓ | | |
| | AG = EC | | (2) |
| 4.3 | AF = CH | (given) ✓ | |
| | AG = EC | (proved) ✓ | |
| | $\hat{A}_2 = \hat{C}_2$ | (proved) ✓ | |
| | △FAG ≡ △HCE | (SAS) ✓ | |
| | FG = EH | (≡ △s) ✓ | (5) |
| 4.4 | Similarly; △FDE ≡ △HBG | (SAS) ✓ | |
| | EF = HG | (≡ △s) ✓ | |
| | EFGH is a parallelogram | (2 pairs of opp. sides =) ✓ | (3) |
| | | | **[13]** |
| | | | **Total: [50]** |

## Exemplar Assessments Memorandum

# Term 4: Examination Paper 1

1.1.1 $3x(4x^2 - 1)$ ✓ $= 3x(2x + 1)(2x - 1)$ ✓✓ (3)

1.1.2 $(x - 3)(x + 14)$ ✓✓ (2)

1.1.3 $x(1 - y) + 1(y - 1)$ ✓

$= x(1 - y) - 1(1 - y)$ ✓

$= (x - 1)(1 - y)$ ✓ (3)

1.1.4 $\frac{(x-1)(x^2+x+1)}{x^2+x+1}$ ✓ $= (x - 1)$ ✓ (2)

1.2.1 $\frac{3^x \cdot 3^1 - 3^x \cdot 3^{-1}}{3^x}$ ✓ $= \frac{3^x \cdot \left(3 - \frac{1}{3}\right)}{3^x}$ ✓ $= \frac{8}{3}$ ✓ (3)

1.2.2 $\frac{3(4x^2-1)}{(2x-1)(x+1)} \div \frac{3(2x+1)}{(x+1)^2} = \frac{3(2x-1)(2+1)}{(2x-1)(x+1)} \times \frac{(x+1)^2}{3(2x+1)} = x + 1$ ✓ (✓ ✓ ✓ ✓) (6)

**[19]**

2.1.1 $x^2 - x - 20 = 0$ ✓

$(x - 5)(x + 4) = 0$ ✓

$x = 5$ ✓or $x = -4$ ✓ (4)

2.1.2 $4^{x+1} = \frac{1}{64}$ ✓

$4^{x+1} = 4^{-3}$ ✓

$x + 1 = -3$ ✓

$x = -4$ ✓ (4)

2.2 $\frac{3x+4}{4} = -2x - 10$ ✓

$3x + 4 = -8x - 40$ ✓

$11x = -44$

$x = -4$ ✓ and $y = -2$ ✓ (4)

**[12]**

3.1.1 10 ✓; $-16$ ✓ (2)

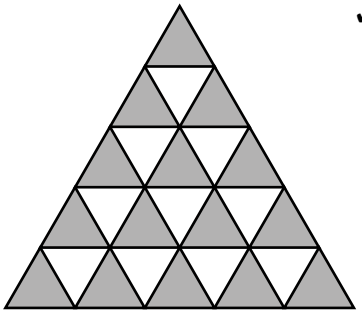
3.1.2 $T_n = 14$ ✓ $- 6n$ ✓ (2)

3.1.3 $T_{25} = 14 - 6(15)$ ✓

$T_{25} = -136$ ✓ (2)

3.1.4 $-76 = 14 - 6n$ ✓

$n = 15$ ✓ (2)

3.2.1  ✓✓ (2)

3.2.2.1 $21 + 7 + 8 = 36$ ✓✓ (2)

3.2.2.2 White ties $= 1 + 2 + 3 + 4 + 5 + 6 + 7$ ✓ $= 28$ ✓

Total number of tiles $= 36 + 28 = 64$ ✓ (3)

**[13]**

4.1.1 $y = \frac{3}{2}\left(\frac{1}{2}\right)^0 - 6$ ✓

$y = -\frac{9}{2}$ ✓

$D\left(0; -\frac{9}{2}\right)$ (2)

4.1.2 $y = -6$ ✓ (1)

4.1.3 $y > -6$ ✓ (1)

4.2.1 $0 = \frac{3}{2}\left(\frac{1}{2}\right)^x - 6$ ✓

$4 = 2^2 = 2^{-x}$

$x = -2$ ✓

$A(-2; 0)$ (2)

4.2.2 At $A(-2; 0)$: $f(-2) = a(-2)^2 + q$

$0 = 4a + q$ ① ✓

v At $E(1; 3)$: $f(1) = a(1)^2 + q$

$3 = a + q$ ② ✓

① − ②: $-3 = 3a$`

$a = -1$ ✓ and $q = 4$ ✓ (4)

4.3.1 $CD = 4 - (-4{,}5)$ ✓ $= 8{,}5$ ✓ (2)

4.3.2 $m_{AD} = \frac{0 - (-4{,}5)}{-2 - 0} = -\frac{9}{4}$ ✓✓

$y = -\frac{9}{4}x - \frac{9}{2}$ ✓ (3)

4.4.1 $-2 < x < 2$ ✓✓ (2)

4.4.2 $x < 0$ ✓ (1)

**[18]**

5.1 $m = \frac{4 - (-4)}{-3 - 5} = -1$ ✓

$y - 4 = -1(x + 3)$

$y = -x + 1$ ✓

$a = -1; q = 1$ (2)

## Exemplar Assessments

5.2 $-\frac{1}{x}+1=-x+1$ ✓

$-\frac{1}{x}=-x$ ✓

$\sqrt{x^2}=\sqrt{1}$ ✓

$x=\pm 1$ ✓ (4)

5.3 $0<x<1$ ✓✓ and $x<-1$ ✓ (3)

5.4 $f(5)=-\frac{1}{5}+1=\frac{4}{5}$ ✓

BE $=\frac{4}{5}-(-4)$ ✓ $=4{,}8$ ✓ (3)

5.5 $h(x)=\left(-\frac{1}{x}+1\right)+3=-\frac{1}{x}+4$ ✓ (1)

**[13]**

6.1 $A=P(1+i)^n$ ✓

$24\,000=8\,000(1+i)^3$ ✓

$\sqrt[3]{\frac{24\,000}{8\,000}}=1+i$

$i=44{,}22\%$ ✓ (3)

6.2.1 Deposit $=\frac{10}{100}\times 5\,000=500$ ✓

Balance $=4\,500$ ✓

$A=4\,500(1+3\times 0{,}08)$ ✓

$A=5\,580$ ✓

Instalments $=\frac{5\,580}{36}=$ R155 ✓ (5)

6.2.2 Interest $=5\,580-4\,500$ ✓ $=1\,080$ ✓ (2)

6.3 $4\times 950=3\,800$ ✓

Cost in USD $=\frac{3\,800}{13{,}44}$ ✓ $=282{,}74$ ✓ (3)

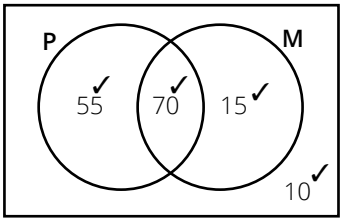
**[13]**

7.1.1 $\frac{3}{90}=\frac{1}{30}$ ✓✓ (2)

7.1.2 Event = 09; 19; 29; 39; 49; 59; 69; 79; 89; 90 ✓

Prob $=\frac{10}{90}=\frac{1}{9}$ ✓ (2)

7.2.1 (4)




7.2.2.1 $\frac{55}{150}=\frac{11}{30}$ ✓ (1)

7.2.2.2 $\frac{10}{150}=\frac{1}{15}$ ✓ (1)

**[10]**

**Total: [100]**

# Term 4: Examination Paper 2

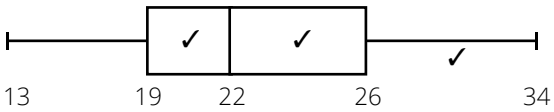
1.1 13; 16; 19; 19; 20; 21; 22; 22; 22; 25; 27; 30; 34 ✓
median = 22 ✓ (2)

1.2.1 $\Sigma x = 290$ ✓
$\bar{x} = \frac{290}{13}$ ✓ = 22,31 ✓ (3)

1.2.2 Range = 34 − 13 ✓ (1)

1.2.3 $Q_1 = 19$; ✓ $Q_3 = 26$ ✓
$IQR = 26 - 19 = 7$ ✓ (3)

1.3 (3)




**[12]**

2.1 $x = 11$ ✓ (1)

2.2 $60 < w \leq 70$ ✓ (1)

2.3 $\Sigma x = 2\,875$ ✓
$\bar{x} = \frac{2\,875}{45}$ ✓ = 63,89 ✓ (3)

**[5]**

3.1 A trapezium has one pair of sides parallel. ✓
$y = 2x + 1$
$y = 3x + 6$ ✓ [arranging in the form $y = mx + c$]
$y = -3x + 2$ and $y = 3x + 1$
The lines $y = 3x + 6$ and $y = 3x + 1$ have the same gradient. ✓
Therefore, they are parallel. ✓ (4)

3.2.1 $\frac{x-5}{2} = -1$ ✓and $\frac{y-3}{2} = 3$ ✓
$x = 3$ and $y = 9$ (2)

3.2.2 $m_{AC} = \frac{9-(-3)}{3-(-5)}$ ✓ $= \frac{3}{2}$ ✓ (2)

3.2.3 $m_{BN} = -\frac{2}{3}$ ✓
$y - 2 = -\frac{2}{3}(x - 7)$ ✓
$y = -\frac{2}{3}x + \frac{20}{3}$ ✓ (3)

3.2.4 AC = $\sqrt{(3+5)^2 + (9+3)^2}$ ✓ $= 4\sqrt{13}$ ✓ (2)

3.2.5 Area = $\frac{1}{2} \times 4\sqrt{13} \times 2\sqrt{13}$ ✓✓ = 52 ✓ (3)

**[16]**

4.1.1 $x^2 + 5^2 = 13^2$ ✓✓
$x = \sqrt{169 - 25}$ ✓ = 12 ✓ (4)

4.1.2 $\tan\theta = \frac{5}{12}$ ✓✓ (2)

## Exemplar Assessments

4.1.3 $\cos^2\theta - 2\sin^2\theta = \left(\frac{12}{13}\right)^2 - 2\left(\frac{5}{13}\right)^2$ ✓✓

$= \frac{144}{169} - \frac{50}{169}$ ✓ $= \frac{94}{169}$ ✓ (4)

4.2 $\frac{\sin 90° \cdot \sin 90° + \tan 45° \cdot \cos 60°}{\tan 45° \cdot \sin 90°} = \frac{1 \times 1 \times \frac{1}{2}}{1 \times 1}$ ✓✓✓ ✓✓

$= \frac{1 + \frac{1}{2}}{1}$ ✓ $= \frac{3}{2}$ ✓ (7)

**[17]**

5.1.1 $\cos\alpha = \frac{PT}{PQ}$ ✓ and $\cos\alpha = \frac{PQ}{PR}$ ✓ or $\cos\alpha = \frac{QT}{QR}$

$\tan\alpha = \frac{QR}{PQ}$; ✓ $\tan\alpha = \frac{QT}{PT}$; ✓ and $\tan\alpha = \frac{TR}{QT}$ ✓ (5)

5.1.2 $\tan 40° = \frac{QT}{5}$ ✓

$QT = 4{,}20$ ✓ (2)

5.2 $2\sin P + \cos 3Q$ ✓ $= 2\sin 30° + \cos 180°$ ✓ $= 0$ ✓ (3)

**[10]**

6.1.1 $\sin 48° = \frac{AD}{18}$ ✓

$AD = 18\sin 48°$ ✓ $= 13{,}38$ ✓ (3)

6.1.2 $\tan B = \frac{13{,}38}{12}$ ✓

$\hat{B} = \tan^{-1}\left(\frac{13{,}38}{12}\right)$ ✓ $= 48{,}1°$ ✓ (3)

6.2.1 $\sin 65° = \frac{AC}{10}$ ✓

$AC = 9{,}06$ ✓ (2)

6.2.2 $BC = 9{,}06 - 2 = 7{,}06$ ✓

$\sin E = \frac{7{,}06}{10}$ ✓

$\hat{E} = 44{,}9°$ ✓ (3)

**[11]**

7.1 $y = \sin x$ ✓ (1)

7.2.1 $360°$ ✓ (1)

7.2.2 $1$ ✓ (1)

7.3 $-3$ (1)

7.4 $0° < x < 90°$ ✓✓ (2)

7.5.1 $h(x) = f(x) - 3$ ✓ $= 2\cos x - 3$ ✓ (2)

7.5.2 $-5 \leq y \leq -1$ ✓✓ (2)

**[10]**

8.1.1 $PQ \parallel CB$ ✓ (given)

$P\hat{Q}A = C\hat{B}A = 90°$ ✓ (corr. ∠s; $PQ \parallel CB$) ✓ (3)

$PQ \perp AB$ (proven)

| | | | |
|---|---|---|---|
| 8.1.2 | PQ ∥ CB | (given) ✓ | |
| | AQ = QB | (line through midpoint. ∥ to 2nd side) ✓ | (2) |
| 8.1.3 | Using △PQA and △PQB; | | |
| | PQ = PQ (common) | | |
| | AQ = QB | (proved) | |
| | ∠PQA = ∠PBQ = 90° | (∠s on a str. line) ✓ | |
| | △PQA ≡ △PQB | (SAS) ✓ | |
| | PB = PA = $\frac{1}{2}$ AC | (≡ △s) ✓ | (3) |
| 8.2.1 | Diagonals of a rhombus. ✓ | | (1) |
| 8.2.2 | $\widehat{N}_1 = \widehat{N}_2 = 30°$ | (Diagonal bisects int. ∠s) ✓ | |
| | $\widehat{O}_1 = \widehat{O}_4 = 90°$ | (Diagonals of a rhombus bisect at 90°) ✓ | |
| | $\widehat{K}_1 = \widehat{M}_1 = 60°$ | (∠ sum of △) ✓ | |
| | △KNM is equilateral. | | (3) |
| 8.2.3 | OK = $p$ | (diagonals of a parm.) ✓ | |
| | ON = $\sqrt{(2p)^2 - p^2} = p\sqrt{3}$ | (Pythagoras) ✓ | |
| | LN = $2\sqrt{3}p$ | (diagonals of a parm.) ✓ | (3) |
| 8.3 | AF = CH | (given) ✓ | |
| | AD = BC | (opp. sides of parm.) ✓ | |
| | $\widehat{A}_1 = \widehat{C}_1$ | (alt. ∠s; AD ∥ BC) ✓ | |
| | △AFD ≡ △CHB | (SAS) ✓ | (4) |
| | | | **[19]** |
| | | | **Total: [100]** |