Information about the 2013 examination

The examination will be based on the Mathematics A Senior External Syllabus 2006. It will consist of two papers. Each paper will have 10 minutes perusal/planning time and 3 hours working time.

Both papers will contain extended-response questions. There will be no multiple-choice questions.

The following syllabus topics will be assessed.

**Paper One**
- Managing money 1
- Elements of applied geometry
- Linking two and three dimensions
- Introduction to data and its presentation.

**Paper Two**
- Managing money 2
- Maps and compasses — navigation
- Exploring and understanding data
- Operations research — networks and queuing.

**Assessment**

Candidates should attempt every question in each paper.

Candidates’ responses to questions in each paper will be judged against the syllabus exit criteria:
- Knowledge and procedures
- Modelling and problem solving
- Communication and justification.

For each candidate, a level of achievement will be determined by applying the syllabus standards to an overall assessment of responses across both Paper One and Paper Two.

Specific information about the application of assessment criteria and the standards for assessment is attached.

**Formulas**

A resource book containing formulas will be provided with each paper. These formulas are attached.
Enquiries

Telephone (07) 3864 0211 or email externalexams@qsa.qld.edu.au.

Jo-Anne Cooper
Manager
Assessment Operations
Criteria and marking details

**Knowledge and procedures (KP)**

Responses to questions identified as **KP** will be assessed to gather information about a candidate’s achievement in the criterion *Knowledge and procedures*. This information will be used to award a standard of A–E according to the descriptors in the following table.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The overall quality of a candidate’s achievement across all topics and across the full range within the contexts of complexity, application and technology <strong>consistently</strong> demonstrates an accurate recall, selection and an accurate and proficient use of definitions, rules and procedures. Accurate and proficient use of technology.</td>
</tr>
<tr>
<td>B</td>
<td>The overall quality of a candidate’s achievement across all topics and across a range within the contexts of complexity, application and technology <strong>generally</strong> demonstrates an accurate recall, selection and an accurate use of definitions, rules and procedures. Accurate use of technology.</td>
</tr>
<tr>
<td>C</td>
<td>The overall quality of a candidate’s achievement in the contexts of complexity, application and technology <strong>generally</strong> demonstrates an accurate recall and use of basic definitions and rules and an accurate use of basic procedures. Use of technology.</td>
</tr>
<tr>
<td>D</td>
<td>The overall quality of a candidate’s achievement in the contexts of complexity, application and technology <strong>sometimes</strong> demonstrates an accurate recall and use of some definitions and rules. Use of some technology.</td>
</tr>
<tr>
<td>E</td>
<td>The overall quality of a candidate’s achievement <strong>rarely</strong> demonstrates knowledge and the use of procedures.</td>
</tr>
</tbody>
</table>

**Modelling and problem solving (MP)**

Responses to questions identified as **MP** will be assessed to gather information about a candidate’s achievement in the criterion *Modelling and problem solving*. This information will be used to award a standard of A–E to each response according to the descriptors in the following table.

<table>
<thead>
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<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The candidate has correctly solved the problem using clear and valid mathematical argument exhibiting the selection and use of effective strategies to interpret, analyse and clarify a range of situations. The response exhibits informed decision making through a fully developed solution. When appropriate, the response exhibits initiative and recognises the strengths and limitations of a model.</td>
</tr>
<tr>
<td>B</td>
<td>The candidate has used clear and generally valid mathematical argument exhibiting the selection and use of strategies to interpret, analyse and clarify a range of situations. When appropriate, the response exhibits informed decision making through a fully developed solution.</td>
</tr>
<tr>
<td>C</td>
<td>The candidate’s response shows progress towards a solution. This response exhibits mathematical argument used to interpret and clarify situations through the selection of problem solving strategies and/or procedures.</td>
</tr>
<tr>
<td>D</td>
<td>The candidate’s response demonstrates the following of basic procedures and/or strategies which may be used to solve problems.</td>
</tr>
<tr>
<td>E</td>
<td>The candidate’s response shows no meaningful progress towards solving the problem.</td>
</tr>
</tbody>
</table>
**Communication and justification (CJ)**

Responses to all questions in Part B of both papers will be assessed to gather information about a candidate’s achievement in the criterion *Communication and justification*. This information will be used to award a standard of A–E according to the descriptors in the following table.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The overall quality of a candidate’s responses across all topics and across the full range of contexts consistently demonstrates an accurate use of mathematical terms, symbols and language to support the development of mathematical argument in decision making and reaching conclusions. Effective presentation and organisation of information into forms suitable for various uses. Justification of procedures is evident.</td>
</tr>
<tr>
<td>B</td>
<td>The overall quality of a candidate’s responses across topics and across a range within each context generally demonstrates an accurate use of mathematical terms, symbols and language to support the development of simple mathematical argument in decision making and reaching conclusions. Information is organised into forms suitable for a given use.</td>
</tr>
<tr>
<td>C</td>
<td>The overall quality of a candidate’s responses in some contexts generally demonstrates an accurate use of basic mathematical terms, symbols and language to support the development of simple mathematical argument. Information is organised into a variety of forms.</td>
</tr>
<tr>
<td>D</td>
<td>The overall quality of a candidate’s achievement sometimes demonstrates evidence of the use of the basic conventions of language and mathematics.</td>
</tr>
<tr>
<td>E</td>
<td>The overall quality of a candidate’s achievement rarely provides evidence of the use of the basic conventions of language and mathematics.</td>
</tr>
</tbody>
</table>
Formulas

Statistics
You will be expected to calculate summary statistics using statistical functions on your calculator.

Geometry

Circumference of a circle
\[ C = \pi D \]
\( D = \text{diameter} \)

Area of a circle
\[ A = \pi r^2 \]
\( r = \text{radius of the circle} \)

Area of a triangle
\[ A = \frac{1}{2}bh \]
\( b = \text{base length} \)
\( h = \text{perpendicular height} \)

Area of a parallelogram
\[ A = bh \]
\( b = \text{base length} \)
\( h = \text{perpendicular height} \)

Area of a trapezium
\[ A = \frac{1}{2}h(a + b) \]
\( a \) and \( b \) are parallel sides
\( h = \text{perpendicular height} \)

Area of a sector
\[ A = \frac{\theta}{360} \times \pi r^2 \]
\( \theta = \text{number of degrees in the central angle} \)

Volume
\( r = \text{radius of base} \)
\( h = \text{perpendicular height} \)
\( A = \text{base area} \)

Cone
\[ V = \frac{1}{3} \pi r^2 h \]

Sphere
\[ V = \frac{4}{3} \pi r^3 \]

Cylinder
\[ V = \pi r^2 h \]

Pyramid
\[ V = \frac{1}{3} Ah \]

Prism
\[ V = Ah \]

Surface area
\( r = \text{radius of base} \)
\( h = \text{perpendicular height} \)

Sphere
\[ A = 4\pi r^2 \]

Closed cylinder
\[ A = 2\pi rh + 2\pi r^2 \]

Closed cone
\[ A = \pi r^2 + \pi r\sqrt{r^2 + h^2} \]
Trigonometry

\[ \sin \alpha = \frac{y}{z}, \cos \alpha = \frac{x}{z}, \text{ and } \tan \alpha = \frac{y}{x} \]

Pythagoras’ theorem: \[ z^2 = x^2 + y^2 \]

Financial formulas

Simple interest
\[ I = Prn \]
\( P \) = initial quantity
\( r \) = percentage interest rate per period expressed as a decimal
\( n \) = number of periods

Compound interest
\[ A = P(1 + r)^n \]
\( A \) = final balance
\( P \) = initial quantity
\( r \) = percentage interest rate per compounding period expressed as a decimal
\( n \) = number of compounding periods

Diminishing value formula
\[ S = V_0(1 - r)^n \]
\( S \) = salvage value of an asset after \( n \) periods
\( V_0 \) = initial value of the asset
\( r \) = percentage interest rate per period expressed as a decimal
\( n \) = number of periods

Dividend percentage
\[ \text{Dividend} \% = \frac{\text{dividend per share}}{\text{par value of share}} \times 100 \]

Yield percentage
\[ \text{Yield} \% = \frac{\text{dividend per share}}{\text{market price per share}} \times 100 \]

Flat rate interest reducing balance rate
\[ E = \frac{2Rn}{n+1} \]
\( E \) = effective rate of interest
\( R \) = annual flat rate of interest
\( n \) = number of equal instalments

Navigation

Along a meridian of longitude, \( 1^\circ = 111 \) kilometres

The straight line distance, \( d \), to the horizon from something at a height, \( h \), is given by:
\[ d = 1.927\sqrt{h} \text{ nautical miles, if } h \text{ is in metres} \]
\[ d = 1.064\sqrt{h} \text{ nautical miles, if } h \text{ is in feet} \]

Allowance for refraction: increase distance by one-twelfth

When required, note that:
- the radius of the Earth is 6400 kilometres
- 1 nautical mile = 1.852 kilometres
- 1 kilometre = 0.54 nautical miles
- 1 foot = 0.3048 metres
- 1\(^\circ\) subtends 60 nautical miles along a meridian