Gymea Technology High School
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Year 11 Advanced Mathematics

# Task 2 – Breaking Down Questions: Investigation and Quiz

**Due Date**: 24th June 2024

**Task Distributed**: 4 June 2024 **Unit**: Trigonometry and Functions

**Task Type**: Investigation and Quiz **Task Weighting**: 25%

**Outcomes**: MA11-1, MA11-2, MA11-3, MA11-8, MA11-9

## Task Description

**Part A: Create a Topic Study Guide**

Students will create a Topic Study Guide for the topics outlined above; **Trigonometry and Functions.** The Topic Study Guide will consist of:

- A glossary of the **key verbs** and **topic specific terminology** presented in these topics in identified HSC questions.
- **Annotations** of the worked solution to each identified HSC question that has been provided for you in your exam pack on Google Classroom.

  *Note: the answers provided are not in order*

*Your teacher will provide you with a completed **scaffold** from a prior HSC exam paper for one of your topics.*

*A **blank scaffold** will also be provided, if you wish to use it to form your topic study guide.*

**Part B: Moodle Quiz**

Students will sit a short in-class Moodle quiz assessing the knowledge and skills developed through your investigation. The questions will require you to:

- Identify key verbs and terminology in past HSC questions.
- Match definitions to key verbs and key math terms.
- Identify steps to solve a question when presented with a key term
- Solve a range of past HSC multiple-choice questions from the topic areas listed above.

## Details of Submission

**Part A: Topic Study Guide**
Students are encouraged to use the scaffold on google classroom to produce their Topic Study Guide.

This needs to be submitted on the day of the Moodle Quiz: 24th June period 2, 2024.

**Part B: Moodle Quiz**
For the Moodle Quiz, you must bring the following equipment.

- Board approved calculator
- Blue or black pen

You can successfully prepare for the Moodle Quiz by:

- Being familiar with your topic study guide
- Reviewing class work and past HSC examples from each topic in the study guide.
- Ensuring all set work is up to date.
- Practice completing examination questions with detailed answers under time pressure. (1 mark = 1.5 minutes).
- Seek teacher assistance for unclear work.
- Review the HSC Reference Sheet. You will be provided with one for the quiz.

## Teacher Feedback and Student Self-Reflection

- The task will typically be returned to students within 14 days of the due date.
- At this time feedback including information on how to improve will be provided through analysis of the examination questions as a class discussion. Explanation will be provided as requested.
- Students can clarify or seek further feedback by speaking with their teacher or the assessment marker.

Upon return of the task, students will also be expected to complete a self-reflection. This will require students to review incorrect responses by seeking clarification from the teacher. Additionally, students will be required to complete a survey in reflection of the examination.

How does this link to my learning?

- It will assist you in developing your skills and understanding in how to recognise these key terms in examination style questions and determine how they lead you to the solution you are required to develop
- This task will be used by you and your teachers to assess your knowledge and understanding of course outcomes and allow you to refine your skills as you prepare for the HSC examination.
- This task will draw together the above outcomes and assess your ability to apply a range of mathematical skills and techniques that you have covered in class.

## Assessment Procedures

Students who are absent from the examination, or have a legitimate reason for missing the task, must notify the school before the exam commences. To avoid a zero mark being awarded, any absence must be supported by valid misadventure/illness documentation as outlined in the Year 11 Assessment Booklet.

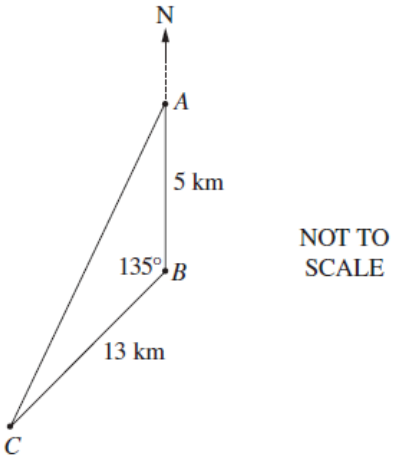
# Instructional Marking Rubric for Part A

| Category | 0 Marks | 1 Mark | 2 Marks | 3 Marks |
|---|---|---|---|---|
| **Identification of key HSC verbs** | Does not identify a question verb or does not show a clear understanding of the verb's meaning. | Correctly identifies at least one verb from a suitable HSC question and attempts to explain its meaning. | Correctly identifies at least three verbs from suitable HSC questions and correctly explains their meaning. | Correctly identifies at least four key verbs from suitable HSC questions and correctly explains their meaning. |
| **Definitions of topic specific terminology** | Does not correctly define any key mathematical terms for either topic or does not show a clear understanding of the terminology. | Correctly identifies at least one key term identified in suitable HSC questions, but the links to the syllabus ideas are not well explained. | Correctly defines at least three key terms identified in suitable HSC questions and provides sufficient understanding of how they link to syllabus ideas / techniques. | Correctly defines at least three key terms from each topic area identified in suitable HSC questions and provides sufficient understanding of how they link to syllabus ideas / techniques. |
| **Identification of questions linked to the topic areas** | Does not identify any questions that link to either topic. | Identifies questions that link to both topics and/or attempts to identify and highlight the key verbs and underline the topic terminology from a suitable HSC question. | Identifies and correctly highlights the key verbs and underlines the topic terminology for at least three questions. They must be suitable HSC questions. | Identifies and correctly highlights the key verbs and underlines the topic terminology for at least five questions. They must be suitable HSC questions. |
| **Annotation of worked solutions, explaining why each step was used.** | Does not identify a question or does attempt to annotate a solution to a question. | Attempts to annotate one identified question that provides a clear understanding of how the key verbs and topic specific terminology link to the solution. | Correctly annotates at least two of their identified questions that provides a clear understanding of how the key verbs and topic specific terminology link to the solution. | Correctly annotates at least two of their identified questions in each topic that provides a clear understanding of how the key verbs and topic specific terminology link to the solution. |

# Worked Example

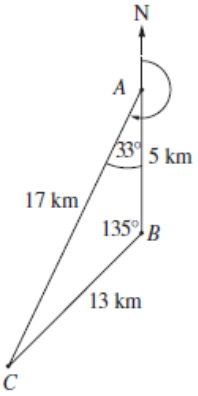
| Trigonometry – Topic Study Guide | |
|---|---|
| **Question Verb(s)** | **Definition** |
| Calculate | *Find the value or the numerical answer.* |
| Determine | *Find the result and describe why or how – draw meaning from the mathematical result* |
| **Key Terms** | **Definition** |
| Location | *Describes the position of the object* |
| Due North | *Gives the direction* |
| Shortest distance | *The unknown side length to be calculated. This is done using the trigonometric ratios, the Sine Rule or Cosine Rule.* |
| Bearing | *A bearing shows direction travelled by an object from North. It shows the location using either compass directions (compass bearings) or a three figure (true bearings) out of a total of 360°* |
| **Questions Appearing in Past HSC Papers** | |
| **Question Name** | 2016 Mathematics HSC Q12a |

The diagram shows the location of three schools. School A is 5 km due north of school B, school C is 13km from school B and angle ABC is 135°.




i) Calculate the shortest distance from school A to school C, to the nearest kilometre.

ii) Determine the bearing of school C from school A, to the nearest degree.

| Worked Solution | Annotation |
|---|---|
| (i)<br>$AC^2 = 13^2 + 5^2 - 2 \times 5 \times 13 \times \cos 135°$<br>$= 285.92\ldots$<br>$AC = \sqrt{285.92\ldots}$<br>$= 16.9\ldots$<br>$= 17$ km (nearest kilometre) | *Use the cosine rule to calculate the distance from A to C because 2 sides and the included angle were given.*<br><br>*Square root the calculated values to solve for side length AC as the cosine formula states $(AC)^2$*<br><br>*Gives the required accuracy* |
| (ii)<br>$\frac{\sin A}{13} = \frac{\sin 135°}{17}$<br>$\sin A = \frac{13 \sin 135°}{17}$<br>$= 0.5407$<br>$A = 32.7\ldots°$<br>$= 33°$ (nearest degree)<br><br>The bearing of school $C$ from school $A$ is $180° + 33° = 213°$.<br><br>  <br> | *Use the Sine Rule to calculate the size of angle A because two sets of corresponding angles and sides were given.*<br><br>*Calculates the answer using inverse sin, because you are finding an angle and round as required*<br><br>*Bearing from A to C starts from North, wrapping around in a clockwise direction from A until you are facing C. So you need to add 33 to 180 as B is south of A.* |