



Student Name		
Teacher	Mr Trufitt	Mr Woodlock

MATHEMATICAL METHODS UNIT 3

SAC 1: Application Task

PART 2 – “GENERALISING THE CONTEXT”

Monday 10 May 2019

Reading time: 5 minutes

Writing time: 35 minutes

Structure of Task

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>
Application Task	2	2

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, one CAS calculator and/or one scientific calculator, and one approved bound reference.
- Students are not permitted to use: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 4 pages.
- Working space is provided throughout the book.

Instructions

- Write your name in the space provided above on this page.
- All responses must be written in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

Students must not disclose the contents of the task; to do so will be a breach of School guidelines.

MATHEMATICAL METHODS UNIT 3

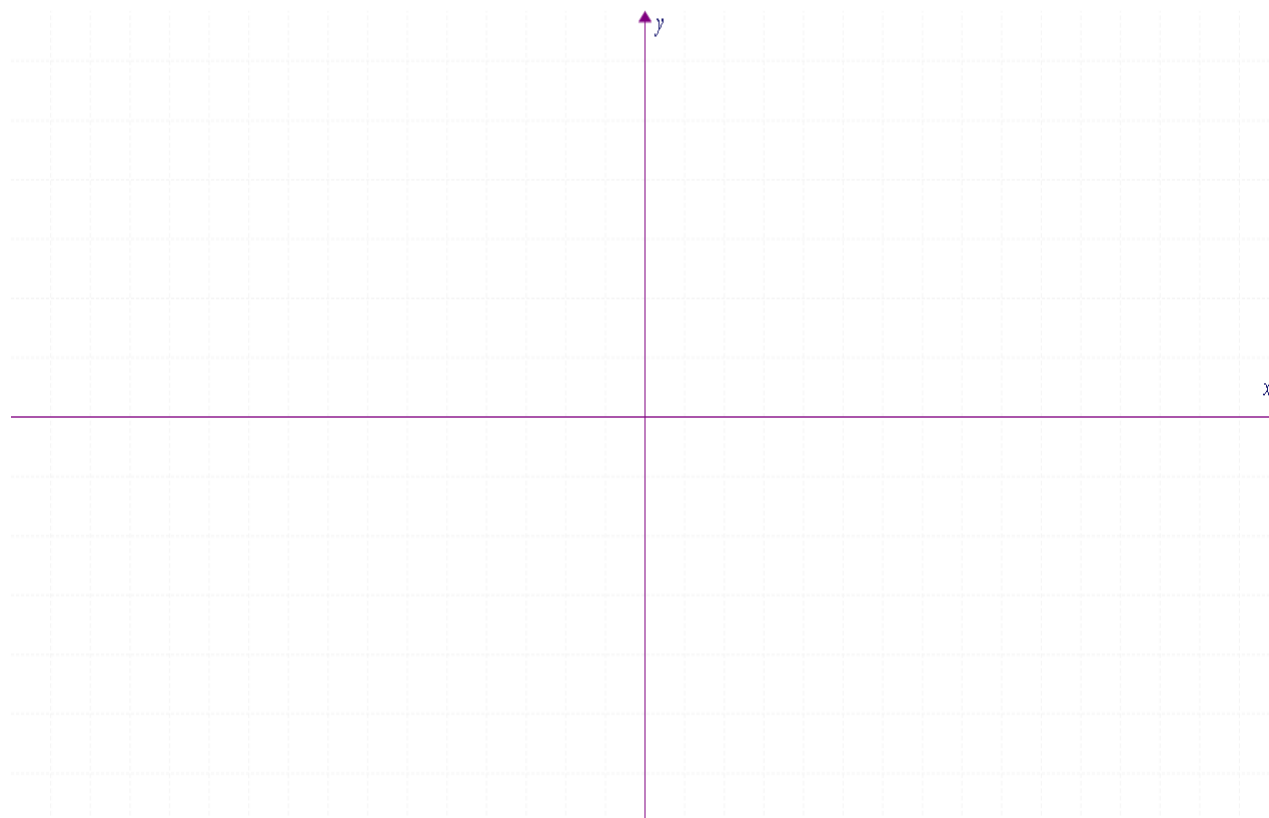
2019 SAC 1: Application Task

PART 2: "GENERALISING THE CONTEXT"

1. A function, h , is defined for $h: D \rightarrow R, h(x) = \log_e((x - p)^2 - m)$.

a. State the maximal domain over which $h(x)$ is defined for the case where: $p > 0, m > 0$.

b. Sketch the graph of $h(x)$, labelling asymptotes and intercepts.



- c. Consider the function where $p = 1$ and m is a constant. Find the value(s) of m for which $x = -2$ is the asymptote.

- d. Find the values of m in terms of p for which $x = -p$ is an asymptote.

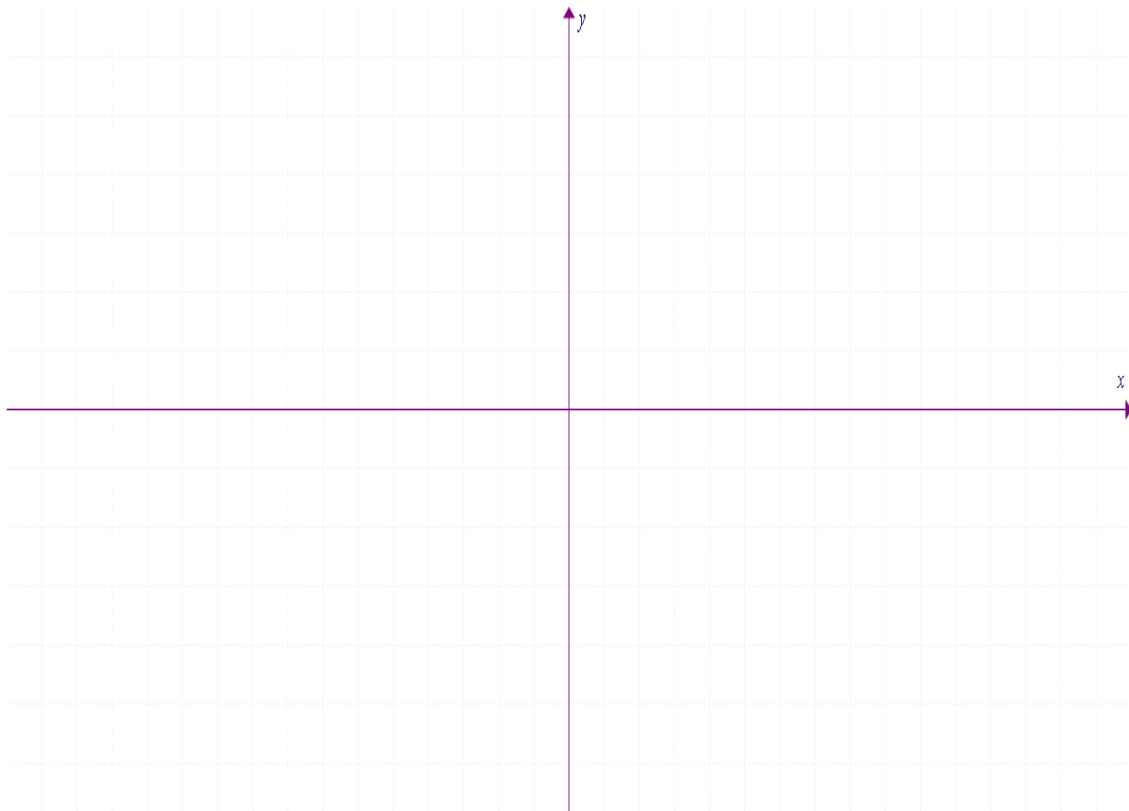
- e. For what values of m in terms of p does an asymptote exist?

WORKING SPACE

2. a. Express the inverse of $h(x)$ as two separate functions, $h_1^{-1}(x)$ and $h_2^{-1}(x)$.

b. State the domain and range for each inverse function, $h_1^{-1}(x)$ and $h_2^{-1}(x)$.

c. Sketch the graphs of $h_1^{-1}(x)$ and $h_2^{-1}(x)$ on the axes below, labelling all key features.



END OF PART 2