**Mathematics Methods Unit 3 & 4 Investigation 1 2022**

**Take Home Section**

Student name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Teacher name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Task type: Investigation**

**Take Home out: Monday Week 4, Term 1, 2022**

**In class Validation: in usual maths rooms 7:40am**

**Time allowed for in class task: \_\_\_\_40\_\_\_\_\_\_\_ mins**

**Materials required:** Formula Sheet; Calculators and/or Classpads

Standard items: Pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: Drawing instruments, NO NOTES

**Task weighting: \_10\_\_\_% in class only**

**Formula sheet provided: Yes**

**Note: All part questions worth more than 2 marks require working to obtain full marks.**

**Question 1**

Use Calculus, investigate the dimension of the largest rectangle that can be inscribed in a circle.



$$r$$

1. Determine the largest area of the rectangle can be inscribed in a circle of radius $10 cm$. Justify your answer.
2. Hence, determine the dimension and the largest area of the rectangle can be inscribed in a circle of radius $r cm$.

**Question 2**

A window frame is to be built from with a rectangular bottom and a semi-circle top. Given 20 meters of framing materials, determine the dimension of the window to allow the maximum amount of light to be let in.



2D🡪3D? wtf

**End of Take-Home Section**