 **2020 MATHEMATICS METHODS Unit 1  
Investigation 1 – Trigonometry**

Distributed Thursday 12th March  
Due Friday 20th March 3.30pm

Weighting: 6%

**NAME: ­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Task**

Consider a circle of radius 3 units, centred at the origin, O.

A chord is drawn from the fixed point A (3, 0) to a point on the circumference of the circle, B.

Investigate

1. How the area OAB varies in relation to the central angle
2. How the length of the chord AB varies as B moves around the circle in relation to the central angle
3. How the area of the segment varies as B moves around the circle
4. How the ratio of the area of the segment to the area of the sector varies

Record your results for 100 intervals from 0 to 3600 and draw graphs to show how the areas and chord length change for each situation above as the central angle varies.

Comment on your findings.

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**Notes**

Present this investigation as a hard copy report, which includes the following:

* an outline of the problem and context
* the method required to find a solution, in terms of the mathematical model or strategy used
* the application of the mathematical model or strategy, including:
  + relevant data and/or information
  + mathematical calculations and results, using appropriate representations
  + the analysis and interpretation of results, including consideration of the reasonableness and limitations of the results
* the results and conclusions in the context of the problem
* a generalisation of results for any fixed point A
* the declaration below, completed, with this page attached to your report as your cover page

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**Declaration**

*I declare that this investigation is my own work and research. I acknowledge that all material used in the preparation and writing of the report has not been previously submitted by another student. I declare that I have not copied in part or whole the work of other students and/or persons.*

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_