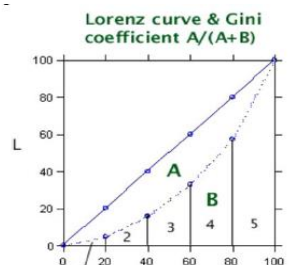
Week 4_5
Term 3
2022

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief
SM4

Goals



By the end of this unit, students:

- understand the concepts and techniques in applications of calculus and statistical inference
- apply reasoning skills and solve problems in applications of calculus and statistical inference
- communicate their arguments and strategies when solving problems
- construct proofs of results
- interpret mathematical and statistical information and ascertain the reasonableness of their solutions to problems.

This week:

Applications of integral calculus:

- calculate areas between curves determined by functions
- determine volumes of solids of revolution about either axis

Theoretical Components

It is a good idea to look at the graphs on CAS

Area Between Curves

View the following video

Areas about the x axis:

http://www.youtube.com/watch?v=DRFyNHdVgUA

View the following video

Areas about the y axis:

http://www.youtube.com/watch?v=70NQ3ISYihw

Be careful of intersection points of the functions. These may change the sign of the area…so you may have to split up the areas and add them to find the total area between curves.

Volume of Solids of Revolution:

https://goo.gl/NJbvPP

Videos:

Example 1: https://goo.gl/uF2EFQ

Example 2: https://goo.gl/j6SgFD

Example 3: https://goo.gl/KT2hxf

Example 4: https://goo.gl/XGKMj5

Practical Components

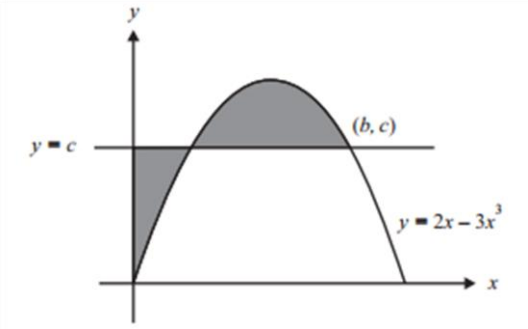
Exercises: available in Google Classroom/ABOUT/Resources/WK04

Set 1: Area Between Curves– attempt all even numbered questions.

Set 2: Volume of Solids of Revolution – attempt odd numbered questions.

Investigation

The horizontal line y = c intersects the curve $y = 2x - 3x^3$ in the first quadrant as in the figure. Show that c must be $\frac{4}{9}$ so that the areas of the two shaded regions are equal.



20 marks

Q/F/O
Quiz/Forum/Other

Around the x-axis $V = \int_{x=a}^{x=b} \pi y^2 \, dx$ Around the y-axis $V = \int_{y=a}^{y=b} \pi x^2 \, dy$

Application of Definite Integral (Lorenz Curve & Gini Coefficient)- https://goo.gl/kCcUWp