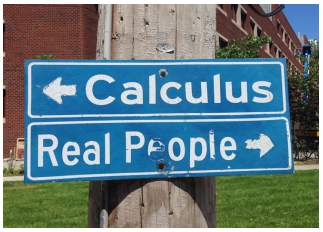
Week 1
Term 4
2020

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief
SM4

Goals



Check out more info.

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:

- integrate using the trigonometric identities $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$, $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$ and $1 + \tan^2 x = \sec^2 x$
- use substitution $u = g(x)$ to integrate expressions of the form $f(g(x))g'(x)$

Theoretical Components

Read the notes and study the examples.

U-Substitution:

- https://bit.ly/38bfbPw

Trig Substitution:

- https://bit.ly/3dMew8y

Video Examples:

- https://goo.gl/F5eoMU
- https://goo.gl/GLbTuY
- https://goo.gl/Bt5XCK
- https://goo.gl/Yfk7pr
- https://goo.gl/VP9Ce6
- https://goo.gl/3tuCwq

For fun lovers:

Gauss's magic shoelace area formula and its calculus companion:
https://goo.gl/l6QOys

Practical Components

Exercises: available in Google Classroom/ABOUT/Resources/S2/Term3/WK01

Set 1: U Substitution – attempt all questions in the exercise sets.

Set 2: TrigonometSubstitu_ - attempt questions 1-30 (you may do more if you like to have more fun!)

Investigation

Show that

$$\int \sqrt{5 + 4x - x^2}\, dx = \frac{9}{2}\sin^{-1}\left(\frac{x-2}{3}\right) + \frac{1}{2}(x - 2)\sqrt{5 + 4x - x^2} + C.$$

Your working-out should be organised logically and set clearly.

Interpret the result of $\int \sqrt{5 + 4x - x^2}\, dx$ for $2 \leq x \leq 5$ for $y \geq 0$.

20 marks (see rubric)

Q/F/O
Quiz/Forum/Other

Answer all the 10 questions: https://goo.gl/Hfh34P