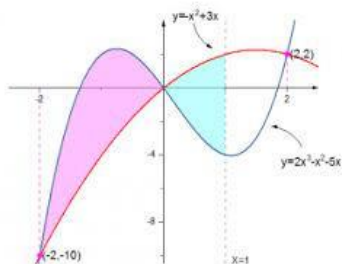


Goals



By the end of this fortnight, you should be able to:

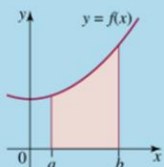
- interpret the definite integral $\int_a^b f(x)dx$ as area under the curve $y = f(x)$ if $f(x) > 0$
- interpret $\int_a^b f(x)dx$ as a sum of signed areas
- recognise and use the additivity and linearity of definite integrals
- calculate the area under a curve
- calculate total change by integrating instantaneous or marginal rate of change
- calculate the area between curves in simple cases
- determine positions given acceleration and initial values of position and velocity.

Theoretical Components

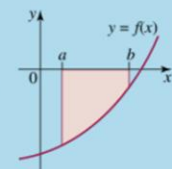
Read & make notes on examples 24-26, 29, 31-32 from Chapter 9 of Maths Quest (pdf – GC).

Area under curves

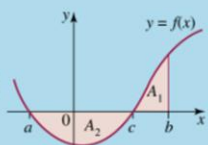
- Area = $\int_a^b f(x) dx$, if $f(x) > 0$ for $x \in [a, b]$



- Area = $-\int_a^b f(x) dx$, if $f(x) < 0$ for $x \in [a, b]$

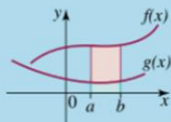


- Area = $\int_c^b f(x) dx - \int_a^c f(x) dx$
= $\int_c^b f(x) dx + \left| \int_a^c f(x) dx \right|$, if $f(x) > 0$ for $x \in [c, b]$
and $f(x) < 0$ for $x \in [a, c]$

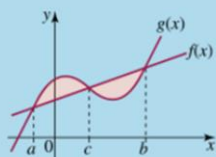


Area between curves

- Area = $\int_a^b [f(x) - g(x)] dx$, if $f(x) > g(x)$ for $x \in [a, b]$



- Area = $\int_a^c [g(x) - f(x)] dx + \int_c^b [f(x) - g(x)] dx$,



QFO

Quiz/Forum/Other

In-class test – open book.

Make sure you have completed all practical work since week 9.

Bring your CAS.

Practical Components

Complete the following questions. Organise your solutions neatly in your exercise book.

You will require Chapter 9 of Maths Quest Methods (pdf – Google Classroom).

Ex 9F Signed areas

- Q's 3-4 (a), 5(e), 6(e,i), 10

Ex 9G Further areas

- Q's 2 (a,e,f), 4, 11, 14, 17

Ex 9H Areas between two curves

- Q's 1 (a,e,f,g), 5, 11, 14

Ex 9I Further applications of integration

- Q's 1, 5, 7, 10, 11

Investigation

In-class test on Friday week 14.