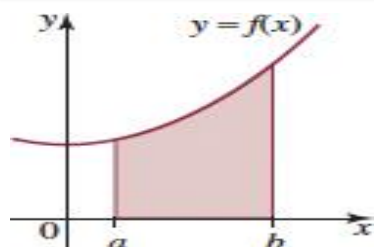


Goals



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

- Understand the use of areas of rectangles (and other shapes) to approximate the area under a given curve between defined intervals
- Understand the use of sigma notation and limits to approximate area under a curve

Theoretical Components

JacPlus eBook *Year 12 Maths Quest Methods*
Chapter 9 (pdf – Google Classroom).
Read and make notes on worked examples 12 to 20.

Watch these YouTube videos:
Approximating area under a curve using rectangles:

<http://www.rootmath.org/calculus/area-intro>

Approximating areas under curves

- An approximation to the area between a curve and the x -axis can be found by dividing the area into a series of rectangles or trapeziums which are all the same width. The approximation is found by finding the sum of all the areas of the rectangles or trapeziums.
- Lower rectangle approximation \leq actual area \leq upper rectangle approximation
- Trapezoidal approximation =

$$\frac{\text{lower rectangle approximation} + \text{upper rectangle approximation}}{2}$$

- Trapezoidal rule is

$$\int_a^b f(x) dx \cong \frac{h}{2} [f(a) + 2f(a+h) + 2f(a+2h) + \dots + 2f(b-h) + f(b)]$$

where h is the interval width.

Practical Components

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

Ex 9C Integration by recognition

- Q's 1 (a,c,e), 2, 3, 4 (a,c), 5 (a,c), 7 (b), 9, 11, 13, 15 – 17

Ex 9D Approximating areas enclosed by functions

- Q's 1, 2, 4, 6, 8, 11, 14

Investigation

See the next page.

QFO

Quiz/Forum/Other

No mathspace this week.



MM3 Week 11 Investigation

Use an appropriate method to approximate the area between the curve below and the x -axis, from $x = 2$ to $x = 8$.

