

Quantitative Methods

Simpson's Rule

Module No. Cons 1012

Lecturer Jennifer Byrne

BOMDAS Rule

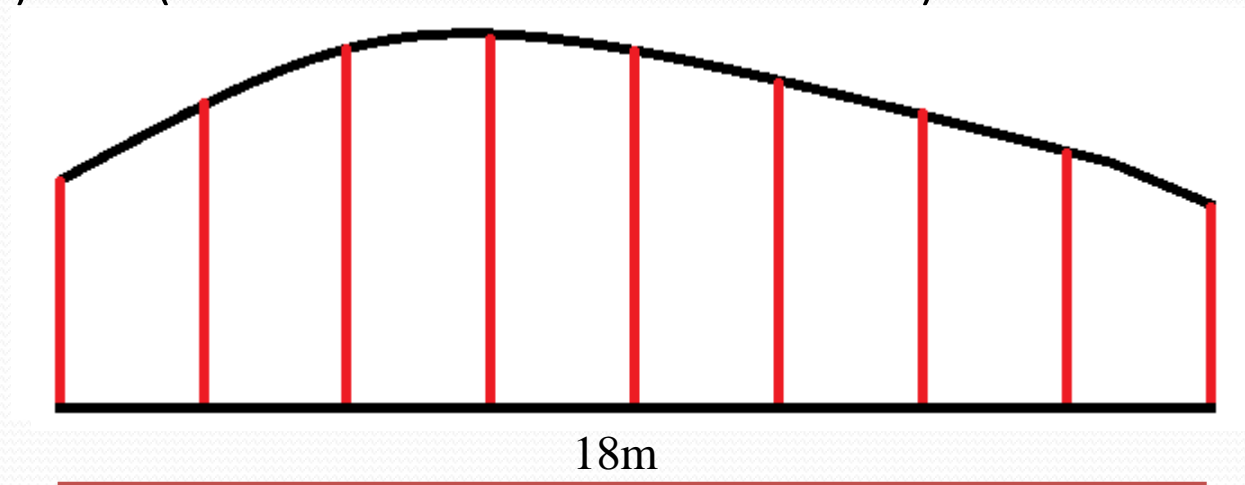
- BOMDAS is an acronym for remembering the order in which you work out mathematical formulas.
- Brackets, Order, Multiplication/Division, Addition/Subtraction
- Another version is BOMDAS or BIDMAS
- or BIDMAS where I stands for Indices power of 2, 3 etc.
- [Khan Academy](#) A non-profit with the mission to provide a free, world-class education for anyone, anywhere.

Simpson's Rule

- Simpson's Rule is used to calculate the area of an irregular surface.
- The surface is measured using Ordinates (or Lengths).
- The Ordinates are measured at regular intervals along the baseline and at right angles to it.
- There should always be an uneven number of ordinates.
- $\text{Area} = W/3 \{ (\text{first} + \text{last}) + 4 (\text{evens}) + 2 (\text{odds}) \}$
- W = width of each section (should be equal widths)
- (first + last) = the first ordinate + last ordinate
- $4 (\text{evens}) = 4 \times (\text{the sum of all of the even ordinates})$
- $2 (\text{odds}) = 2 \times (\text{the sum of all of the odd ordinates})$
- **Do Not include** the first and last ordinate again with the odds ordinates.

Simpson's Rule

- There should always be an uneven number of ordinates.
- $\text{Area} = W/3 \{ (\text{first} + \text{last}) + 4 (\text{evens}) + 2 (\text{odds}) \}$
- W = width of each section (should be equal widths)
- $(\text{first} + \text{last})$ = the first ordinate + last ordinate
- $4 (\text{evens})$ = $4 \times$ (the sum of all of the even ordinates)
- $2 (\text{odds})$ = $2 \times$ (the sum of all of the odd ordinates)



- Here we would divide by 8 to get even widths: $18 \div 8 = 2.25$

Simpson's Rule

- There should always be an uneven number of ordinates.

- Area = $W/3 \{ (first + last) + 4 (evens) + 2 (odds) \}$

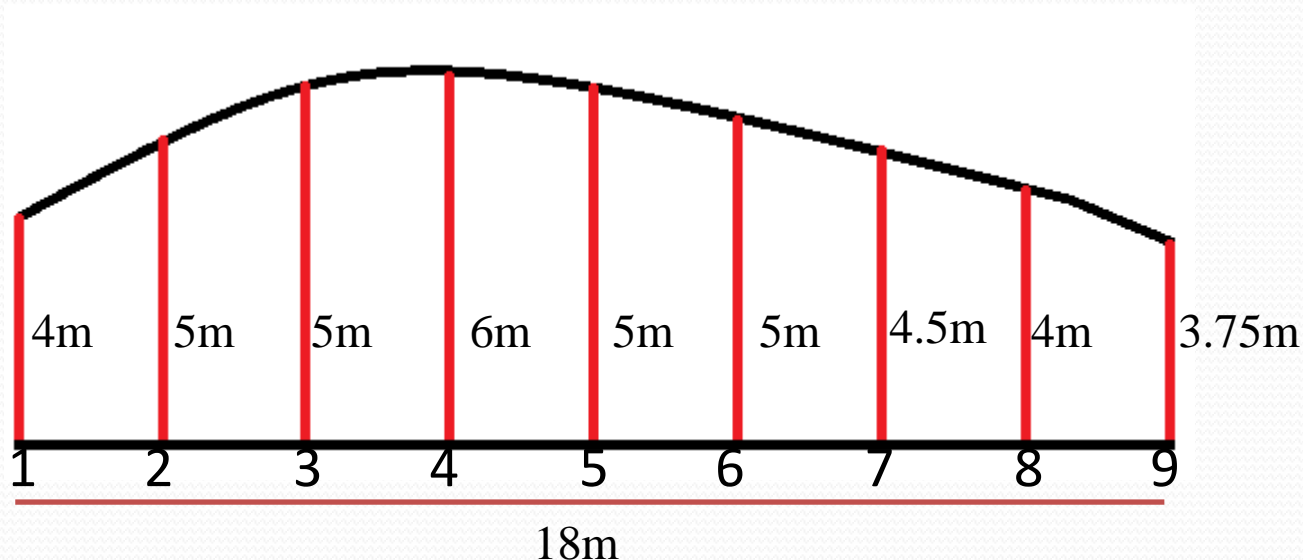
- $W = 18m \div 8 = 2.25m$

- $(first + last) = 4 + 3.75 = 7.75$

- $4 (evens) = 4 \times (5 + 6 + 5 + 4) = 80$

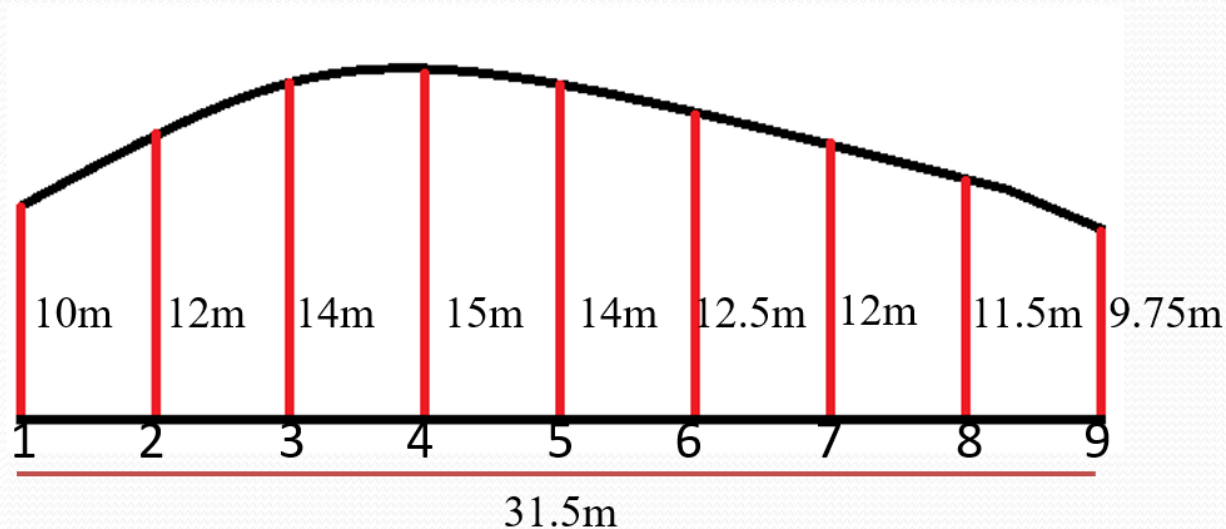
- $2 (odds) = 2 \times (5 + 5 + 4.5) = 29$

$$2.25/3 (7.75 + 80 + 29) =$$
$$2.25/3 (116.75) = 87.56m^2$$



Question 1.

- There should always be an uneven number of ordinates.
- Area = $W/3 \{ (first + last) + 4 (evens) + 2 (odds) \}$
- Calculate the area below.
- First find W
- 9 ordinates means 8 spaces so $31.5m \div 8 = 3.94m$



Simpson's Rule

- There should always be an uneven number of ordinates.

- Area = $W/3 \{ (first + last) + 4 (evens) + 2 (odds) \}$

- $W = 31.5m \div 8 = 3.94m$

$$3.94/3 (19.75 + 204 + 80) =$$

- $(first + last) = 10 + 9.75 = 19.75$

$$3.94/3 (303.75) = 398.925m^2$$

- $4 (evens) = 4 \times (12 + 15 + 12.5 + 11.5) = 204$

- $2 (odds) = 2 \times (14 + 14 + 12) = 80$

