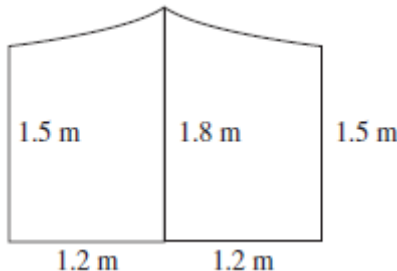


13	15 a	<p>The diagram shows the front of a tent supported by three vertical poles. The poles are 1.2 m apart. The height of each outer pole is 1.5 m, and the height of the middle pole is 1.8 m. The roof hangs between the poles. The front of the tent has area $A \text{ m}^2$.</p> <p>(i) Use trapezoidal rule to estimate A. (ii) Use Simpson's rule to estimate A. (iii) Explain why the trapezoidal rule gives the better estimate of A.</p>		1 1 1
(i)		$\frac{1.2}{2} [1.5 + 1.5 + 2(1.8)] = 3.96$	State Mean: 0.68/1 0.67/1 0.03/1	
(ii)		$\frac{1.2}{3} [1.5 + 1.5 + 4(1.8)] = 4.08$		
(iii)		Simpson's Rule is based on a parabola passing through the three points at the top of the tent. As the Trapezoidal Rule uses straight lines, it would give a better estimate, as it more closely approximates the area of the tent front.		

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

- (i) Most candidates used the trapezoidal rule correctly. These candidates quoted the formula and used it correctly, showing their substitution into the formula. Candidates who used the weighted table method were generally successful.

Common problems were:

- poor use of brackets
- having the correct numerical expression but an incorrect answer
- not finding the correct value of h
- confusing trapezoidal and Simpson's rules and using them in reverse.

- (ii) Most candidates used Simpson's rule correctly. These candidates quoted the formula and used it correctly, showing their substitution into the formula. Candidates who used the weighted table method were generally successful.

Common problems were:

- showing confusion with the use of the extended formula, eg odds and evens
- multiplying the middle function value by 2 instead of 4
- not finding the correct value of h
- poor use of brackets
- having the correct numerical expression but an incorrect answer
- confusing trapezoidal and Simpson's rules and using them in reverse.

- (iii) Candidates who used a diagram were more successful in relating the concave down parabola used in Simpson's rule and the straight lines used in the trapezoidal rule to the actual roofline to illustrate the difference in areas.

Common problems were:

- not knowing that Simpson's rule uses parabolas to estimate area
- not mentioning concavity
- commenting on the number of function values, applications used and subintervals, all of which had no relevance to the question.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/