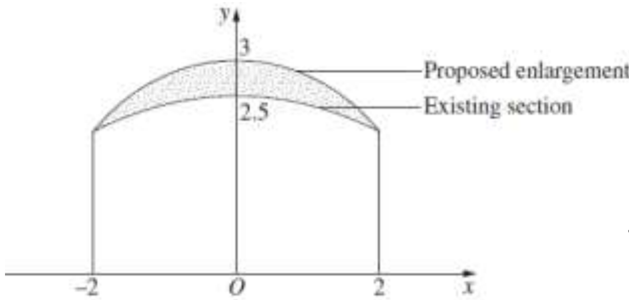
2016 **14 a** The diagram shows the cross-section of a tunnel and a proposed enlargement. **3**



The heights, in metres, of the existing section at 1 metre intervals are shown in Table *A*.

Table *A*: Existing heights

x	−2	−1	0	1	2
y	2	2.38	2.5	2.38	2

The heights, in metres, of the proposed enlargement are shown in Table *B*.

Table *B*: Proposed heights

x	−2	−1	0	1	2
y	2	2.78	3	2.78	2

Use Trapezoidal rule with the measurements given to calculate the approximate increase in area. * *Changed by projectmaths from Simpson's rule.*

Form a table using the differences in the y-values:

x	−2	−1	0	1	2
Difference in y	0	0.4	0.5	0.4	0

Using Trapezoidal rule:

$$\text{Increase} = \frac{1}{2}[0 + 0 + 2(0.4 + 0.5 + 0.4)]$$

$$= 1.3$$

$\therefore$ the increase is 1.3 m^2

State Mean: **n.a.**

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by NESA.

BOSTES: Notes from the Marking Centre

n.a.