

Question	Scheme	Marks	AOs
<b>5 (a)</b>	$\lim_{\delta x \rightarrow 0} \sum_{x=1.44}^{2.89} \frac{2}{\sqrt{x}} \delta x = \int_{1.44}^{2.89} \frac{2}{\sqrt{x}} dx$	B1	1.2
		(1)	
<b>(b)</b>	$= [4\sqrt{x}]_{1.44}^{2.89} = 4 \times 1.7 - 4 \times 1.2$	M1	1.1b
	$= 2$	A1cso	1.1b
		(2)	

**(3 marks)**

**Notes:**

**Mark (a) and (b) together**

**(a)**

B1: States that  $\int_{1.44}^{2.89} \frac{2}{\sqrt{x}} dx$  or equivalent such as  $2 \int_{1.44}^{2.89} x^{-\frac{1}{2}} dx$  or  $2 \int_{1.44}^{2.89} x^{-0.5} dx$  but must include the limits and the dx. Condone  $dx \leftrightarrow \delta x$  as it is very difficult to tell one from another sometimes.

**(b)**

M1: Uses  $\int \frac{1}{\sqrt{x}} dx = a\sqrt{x}$  or  $ax^{\frac{1}{2}}$  (allow  $a$  to be 1) **and** applies the given limits to their  $ax^{\frac{1}{2}}$  subtracting either way round. (Condone with the constant of integration included) You do not need to be concerned by fractions within fractions as this is still of the required form e.g.  $\frac{2x^{\frac{1}{2}}}{\frac{1}{2}}$ . Only condone transcription errors of 2.89 or 1.44 when substituting the limits into the expression. This mark can be scored for

e.g.  $[4\sqrt{x}]_{1.44}^{2.89} = 4 \times \sqrt{2.89} - 4 \times \sqrt{1.44}$  or e.g.  $\frac{2x^{\frac{1}{2}}}{\frac{1}{2}} \rightarrow \frac{2(2.89)^{\frac{1}{2}} - 2(1.44)^{\frac{1}{2}}}{\frac{1}{2}}$

May already be partially evaluated so allow e.g.  $\frac{34}{5} - \frac{24}{5}$  o.e. provided it is not just 2.

A1: 2 cso

The method mark must have been awarded. Do not withhold this mark for poor notation or e.g. a missing dx in their solution.