Question		Answer	Marks	AO	Guidance
3	(a)	$0.25(\log_2 3+\log_2 3.5+\log_2 4+\log_2 4.5)$ or $0.25(\log_2 3.5+\log_2 4+\log_2 4.5+\log_2 5)$	M1	2.1	**One** correct (possibly un-simplified) calculation seen – accept $0.25(1.584...+1.807...+2+2.169...)$ **or** $0.25(1.807...+2+2.169...+2.321...)$ - values must be to at least **3** sf.
		LB: 1.89 UB: 2.07 or 2.08	A1 [2]	1.1	Must be to **3** significant figures. A correct calculation for **one** bound and both values stated correctly is **M1 A1**. **Both correct answers with no working scores SC B1.**
	(b)	$\frac{1}{2}\times\frac{1}{5}\times...$ $...\left[\log_2 3+\log_2 5+2(\log_2 3.4+\log_2 3.8+\log_2 4.2+\log_2 4.6)\right]$	B1 M1	1.1 2.1	**B1** for $\frac{1}{2}\times\frac{1}{5}$ (so use of correct $\frac{1}{2}h$) soi Allow for correct [ ] structure with 5 of the 6 (possibly un-simplified) values correct (to at least **1 dp** rot) but **must** have 6 values. $\left[1.58...+2.32...+2(1.765...+1.925...+2.07...+2.20...)\right]$
		1.98	A1 [3]	1.1	Must be to at least **3** significant figures – for reference: 1.98340053… **Correct answer with no working scores no marks.** **SC B1** for 1.98(268130…) from considering **4 intervals** $\frac{1}{2}\times\frac{1}{4}\times\left[\log_2 3+\log_2 5+2(\log_2 3.5+\log_2 4+\log_2 4.5)\right]$.

Question		Answer	Marks	AO	Guidance
	(c)	**Underestimate** as the tops of the **trapezia** are **below** the **curve**	**B1** **[1]**	**2.4**	Underestimate + correct reasoning e.g. the **curve/graph** is **concave** (or '**concave down**' or '**gradient** of the **curve/graph** is **decreasing**') but **B0** for 'the line is concave' (or any other use of 'line' to indicate the curve) **or** BC gives $\int_0^1 \log_2(2x+3)\,dx = 1.984(6814...)$ provided trapezium rule answer from **5 intervals** is shown correct to at least **3 dp** in this part or part **(b)**. **B0 for contradictory statements** (e.g.'it is an underestimate because the gradient of the curve is decreasing and hence convex'.)