iv) The highest power is

$$\text{Int}\left(\frac{2000}{7}\right) + \text{Int}\left(\frac{2000}{49}\right) + \text{Int}\left(\frac{2000}{343}\right) \checkmark$$

$$+ \text{Int}\left(\frac{2000}{2401}\right) + \text{Other terms, all zero.} \checkmark$$

$$= 285 \checkmark + 40 \checkmark + 5 \checkmark = 330. \checkmark$$

2.

18

2) i) Integrate by parts

$u = \frac{1}{\log t}$ $\quad du = \frac{-1}{t \log^2 t}$

$dv = 1$ $\quad v = t$

$$\int_2^x \frac{dt}{\log t} = \left[\frac{t}{\log t}\right]_2^x + \int_2^x \frac{t}{t \log^2 t} dt \checkmark$$

$$= \frac{x}{\log x} - \frac{2}{\log 2} + \int_2^x \frac{dt}{\log^2 t} \checkmark$$

Which is of the required form with $A = \frac{-2}{\log 2}$ ✓

To evaluate $\int_2^x \frac{dt}{\log^2 t}$ put

$u = \frac{1}{\log^2 t} \Rightarrow du = \frac{-2}{t \log^3 t}$ ✓

$dv = 1 \quad \Rightarrow \quad v = t$

$$\int \frac{dt}{\log^2 t} = \left[\frac{t}{\log^2 t}\right]_2^x + \int_2^x \frac{2}{\log^3 t} dt \checkmark$$

$$= \frac{x}{\log^2 x} - \frac{2}{\log^2 2} + 2\int_2^x \frac{dt}{\log^3 t} \checkmark$$

$$l(x) = \frac{x}{\log x} - \frac{2}{\log 2} + \frac{x}{\log^2 x} - \frac{2}{\log^2 2} + 2\int_2^x \frac{dt}{\log^3 t} \checkmark$$