1.2a \( \infty, \infty, 0, \infty, \infty, 0 \).

1.2b No, instead you should consider \( \lim_{n \to \infty} \frac{e^n}{2^n} = \lim_{n \to \infty} \left( \frac{e}{2} \right)^n \), at which point we note \( \frac{e}{2} > 1 \).

1.2c ii and iii.

1.2d 16 MB, 8 GiB and 4 KiB.

1.2e \( 25 \times 51 = 1275 \) and \( 50 \times 101 - 1275 = 3775 \).

1.2f \( \frac{30^3}{3} = 9000 \) and \( \sum_{k=0}^{100} k^3 \frac{100^4}{4} = 25 \times 1000000 = 25000000 \).

1.2g 1

1.2h When \( N = 0 \), the left side is 0 and \( 2 + (0 - 1)2^1 = 0 \). Assuming it is true for an arbitrary \( N \),

\[
\sum_{k=0}^{N+1} 2^k = (N+1)2^{N+1} + \sum_{k=0}^{N} 2^k = (N+1)2^{N+1} + 2 + (N-1)2^{N+1} = 2 + 2N2^{N+1} = 2 + ((N+1) - 1)2^{N+1}
\]

which is the value of the formula for \( N + 1 \).

1.2i Yes, as it samples the value of the function at four points and the sum of the weights equals 1. An approximately of the value of the function on an interval times the width of the interval is an approximation of the area of the function, so yes. The approximation is 1.3426\( \cdots \) while the actual answer is 1.3414\( \cdots \).

1.2j \( 99 \times 50 = 4950 \).