

$$\begin{aligned} 12b) \int_1^4 dx &= \int_1^2 dx + \int_2^3 dx + \int_3^4 dx \\ &= 1 + 1 + 1 \end{aligned}$$

$$\begin{aligned} \text{(ii)} \int_1^3 x dx &= \int_1^2 x dx + \int_2^3 x dx \\ &= \frac{3}{2} + \frac{5}{2} \\ &= 4 \end{aligned}$$

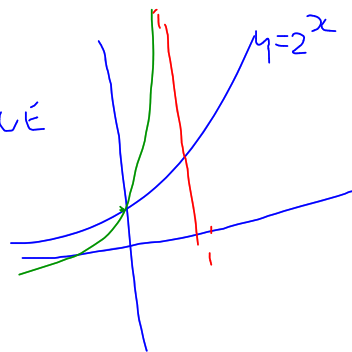
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b) $\int_{-30}^{30} \sin 4x^\circ \cos 2x^\circ dx = 0$ TRUE

c) $\int_{-1}^1 2^{-x^2} dx = 0$ FALSE, even function

d) $\int_0^1 2^x dx < \int_0^1 3^x dx$ TRUE

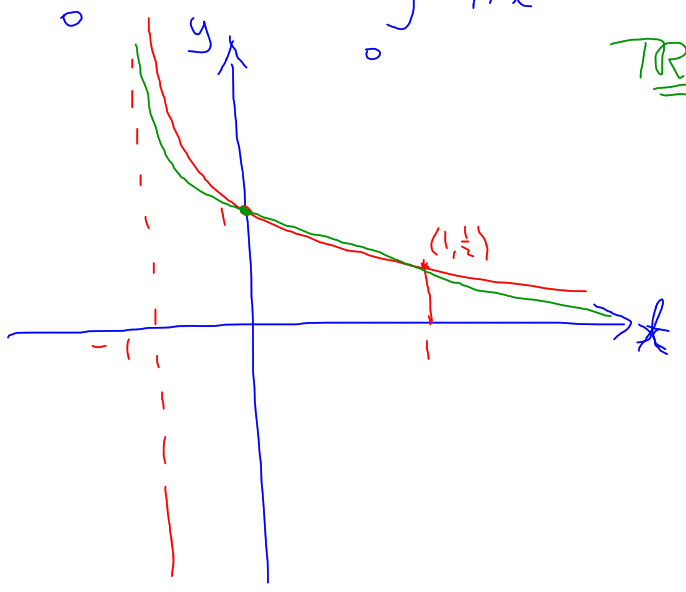
e) $\int_{-1}^0 2^x dx < \int_{-1}^0 3^x dx$ FALSE



BS,

$$\int_0^1 \frac{dt}{1+t^n} \leq \int_0^1 \frac{dt}{1+t^{n+1}}$$

TRUE



$$f) \int_0^1 \frac{dt}{1+t^n} \leq \int_0^1 \frac{dt}{1+t^{n+1}} \quad \textcircled{T} \quad n=1,2,3,\dots$$

$$\begin{aligned} t^{n+1} &\leq t^n \\ 1+t^{n+1} &\leq 1+t^n \\ \frac{1}{1+t^{n+1}} &\geq \frac{1}{1+t^n} \end{aligned}$$