If A is any subset of $\mathbb{R}^k$ then we set
$\mu(A) = \inf\{\sum_i \mu(U_i) : A \subset \bigcup_i U_i \text{ and } U_i \in \mathcal{E}\}$ ✓

This construction follows that on p13-14 of Falconer & follows from Prop 1.7 that this defines a ✓
5/8 measure μ with support contained in F.

Let E_k denote stage k in construction of F.

Explain your method by reference to Falconer (1) p41.

(i) For each interval in E_k take a closed disc diameter 10^{-k} centred at the midpoint of the interval. There are 5^k discs/intervals in $\mathbb{R}$ and they cover F so
$\overline{\dim}_B F \le \lim_{k\to\infty} \log 5^k / -\log(10^{-k}) = \log 5/\log 10.$

The 5^k intervals that make up E_k have 2×5^k distinct endpoints ✓*

*actually only right hand end-points are in F.

each belonging to F. Balls radius $\frac{1}{3}\times 10^{-k}$ (intervals in $\mathbb{R}$) centred at the endpoints are mutually disjoint ✓ (iv) Falconer p.41

$$\underline{\dim}_B F \ge \lim_{k\to\infty} \frac{\log(2\times 5^k)}{-\log(\frac{1}{3}\times 10^{-k})}$$

5/7 $$= \lim_{k\to\infty} \frac{\log 2 + k\log 5}{\log 3 + k\log 10} = \frac{\log 5}{\log 10}$$ ✓

13/20

$$\Rightarrow \underline{\dim}_B F = \overline{\dim}_B F = \frac{\log 5}{\log 10}$$ ✓

4) a