(8)

d) Defn iv.

Take a set of closed balls (discs, here) diameter 3^{-k}, centre the midpoint of a straight line segment of length 3^{-k} in $\mathbb{R}^2$. There are 5^k such balls and they cover F ✓ so

$$\dim_B F \le \lim_{k\to\infty} \frac{\log(5^k)}{-\log(3^{-k})} = \frac{\log 5}{\log 3}$$ ✓

The 5^k line segments that make up E_k have $5^{k+1}+1$ distinct endpoints ✓ each of which belongs to F. Balls (discs, here) of radius $3^{-(k+1)}$ centred at those endpoints are mutually disjoint ✓ so with $\delta_k = 3^{-(k+1)}$ ✓

These were correct and shouldn't have been removed

$$\dim_B F \ge \lim_{k\to\infty} \frac{\log(5^k+1)}{-\log 3^{-(k+1)}} * ✓ = \lim_{k\to\infty} \frac{\log(5^k(1+5^{-k}))}{(k+1)\log 3}$$

$$= \lim_{k\to\infty}\left[\frac{k\log 5 + \log(1+5^{-k})}{(k+1)\log 3}\right]$$ ✓

$$= \frac{\log 5}{\log 3}.$$ ✓

ie $\left[\frac{\log 5}{\log 3} \le \dim_B F \le \frac{\log 5}{\log 3}\right]$ not quite since $\frac{\log 5}{\log 3} \le \underline{\dim}_B F \le \overline{\dim}_B F \le \frac{\log 5}{\log 3}$

$\frac{8}{9}$ $\Rightarrow \dim_B F = \frac{\log 5}{\log 3}$ ✓

* Or $\log(5^k \pm 1) \ge \log 5^k$

$\frac{17}{20}$