

2.

Datos

$$\rho = 700 \frac{\text{users}}{\text{km}^2}$$

$$R = 0,9 \text{ km}$$

$$N = 3$$

1DM A

8 ranuras

$$PB = 0,02$$

$$A_{\text{uplink}} = 10 \frac{\text{mE}}{\text{user}}$$

$$A_{\text{downlink}} = 60 \frac{\text{mE}}{\text{usuario}}$$

a). $\text{Area} = 4,02 \text{ km}^2$

$$\# \text{user Círculo} = \rho \cdot \text{Area}$$

$$\# \text{user Círculo} = 2814 \text{ users}$$

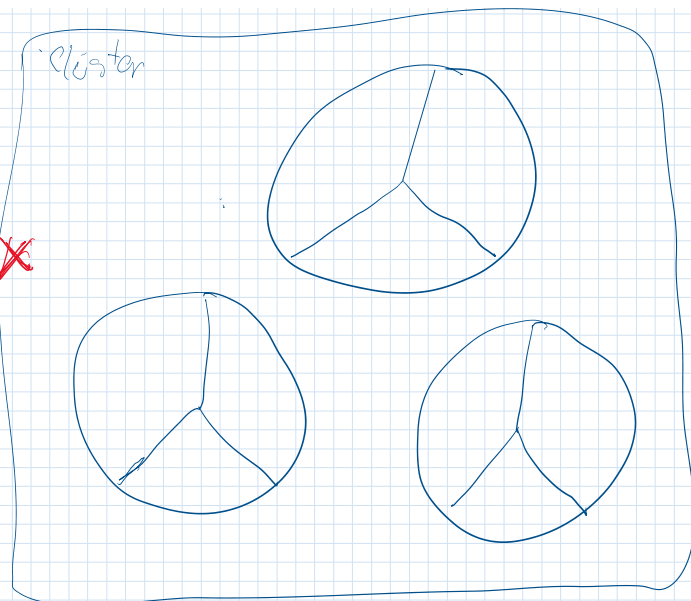
$$\# \text{user Sector} = \underline{938 \text{ users}}$$

b. Uplink

$$A_{\text{sector}} = 10 \frac{\text{mE}}{\text{user}} \cdot 938 \text{ user}$$

$$A_{\text{sector}} = 9,38 \text{ E}$$

$$C = 16 \text{ canales de tiempo}$$



downlink

$$A_{\text{sector}} = 60 \frac{\text{mE}}{\text{user}} \cdot 938$$

$$A_{\text{sector}} = 56,28$$

$$C = 67 \text{ canales de tiempo}$$

c. Uplink

$$\text{canales de } f = 16 \cdot 8 = 128 \text{ por sector} \Rightarrow 384 \text{ canales}$$

Downlink

$$\text{canales de } f = 67 \cdot 8 = 536 \text{ por sector} \Rightarrow 1608 \text{ canales}$$

d.

$$A_{\text{celda Uplink}} = 10 \frac{\text{mE}}{\text{user}} \cdot 2814 = 28,14 \text{ E/celda} \Rightarrow C = 37$$

$$A_{\text{celda Downlink}} = 60 \frac{\text{mE}}{\text{user}} \cdot 2814 = 168,84 \text{ E/celda} \Rightarrow C = 908$$

3.

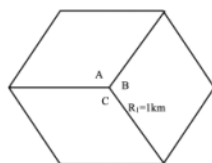


Figura 1

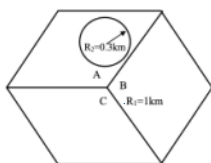


Figura 2

8 ranuras de tiempo

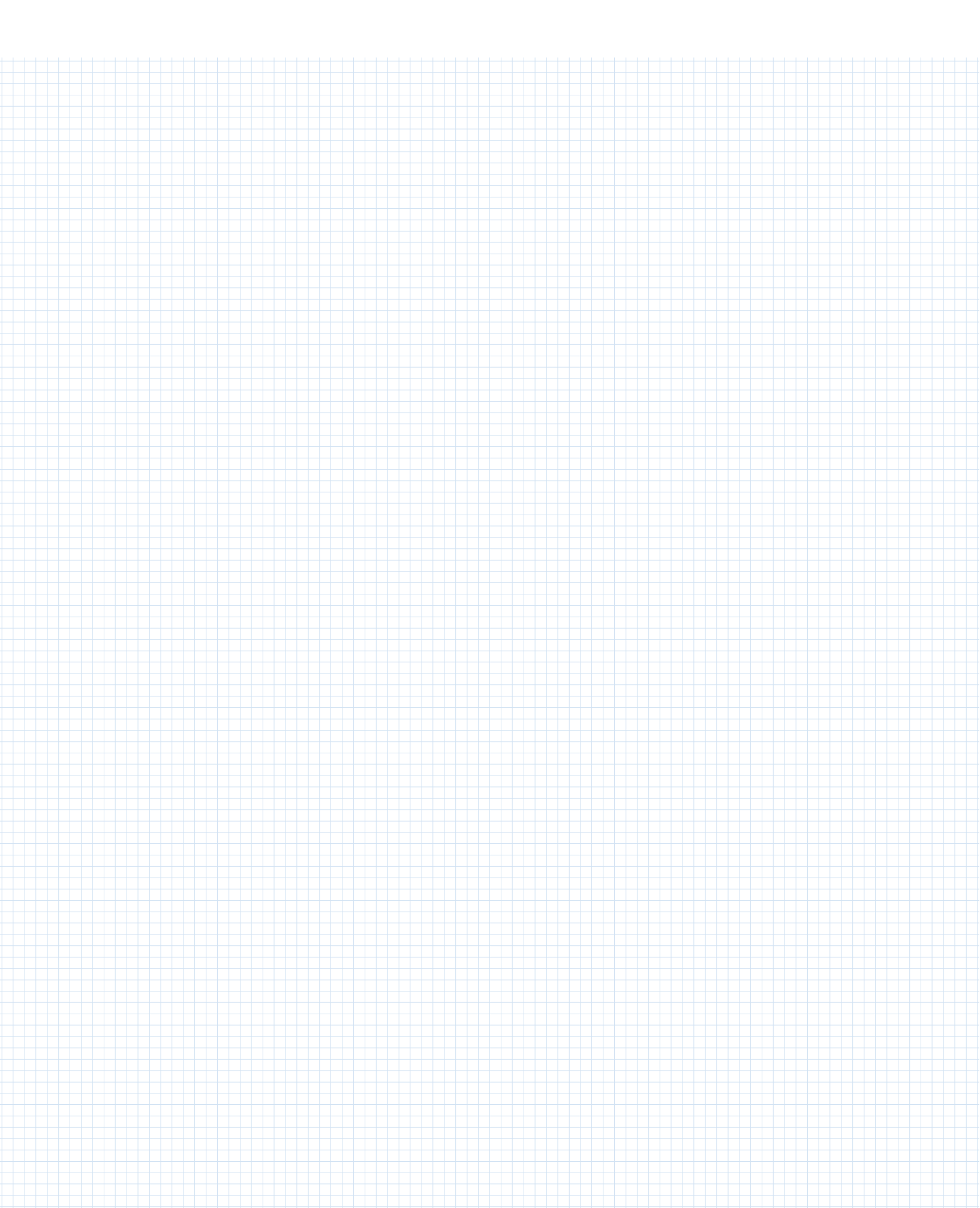
$$\rho = 600 \frac{\text{user}}{\text{km}^2}$$

$$A_u = 30 \frac{\text{mE}}{\text{user}}$$

$$\text{Area sector} = \frac{\sqrt{3}}{2} R^2$$

$$R = 1 \text{ km}$$

$$PB = 0,02$$





$$A_u = 30 \frac{\text{mE}}{\text{user}}$$

$$PB = 0.02$$

a.

$$\text{Area total} = 2.58 \cdot R^2 = 2.58 \text{ km}^2$$

$$\# \text{user total} = \delta \cdot \text{Area total} = 1568 \text{ user}$$

$$A = 30 \frac{\text{mE}}{\text{user}} \cdot 1568 = 47,04 \frac{\text{E}}{\text{celda}}$$

$$C = 58 \text{ canales de tiempo}$$

$$C = \frac{58}{8} \approx 8 \text{ canales frecuencia}$$

b.

Figure 1

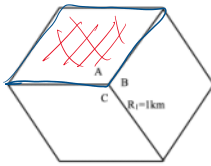


Figure 1

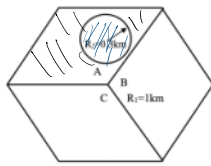


Figure 2

$$\text{Area Sector} = \frac{\sqrt{3}}{2} \cdot R^2 = 0.86 \text{ km}^2$$

$$\# \text{user Sector} = \delta \cdot A_{\text{sector}} = 52$$

$$A_{\text{sector}} = A_u \cdot \# \text{user Sector} = 15,84 \text{ E/sector}$$

$$C = 23 \text{ canales tiempo}$$

$$\delta' = 1842 \frac{\text{user}}{\text{km}^2}$$

$$R_2 = 0.3 \text{ km}$$

$$\text{Area Circulo} = 0.28 \text{ km}^2$$

$$\# \text{usuarios Circulo} = 0.28 \cdot 1842$$

$$\# \text{usuarios Circulo} = 516 \text{ users}$$

$$A_{\text{circulo}} = 516 \cdot 30 \text{ mE} = 15,8$$

$$C = 23 \text{ canales}$$

$$\text{Area Sector} - \text{Area Circulo} = 0.58 \text{ km}^2$$

$$\# \text{usuarios} = 0.58 \cdot 608 = 353$$

$$A = 353 \cdot 30 \text{ mE} = 10.59$$

$$C = 17 \text{ canales}$$

$$\# \text{usuarios Totales} = 516 + 353 = 869$$

$$A = 869 \cdot 30 \text{ mE} = 26.07$$

$$C = 35 \text{ canales}$$

$$\text{Respuesta} = 17 \text{ canales}$$

$$c. \frac{40}{8} = 5 \text{ canales de f}$$

4.

$$a. \lambda = \frac{7 \text{ llamada}}{1}$$

$$\bar{T} = 4 \text{ min}$$



4.

$$S = 600 \frac{\text{user}}{\text{km}^2}$$

$$PB = 0.02$$

$$\text{Area Celda} = 3 \text{ km}^2$$

$$C = 71 \text{ canales}$$

a. $\lambda = \frac{1 \text{ llamada}}{2 \cdot 60 \text{ minutos}}$

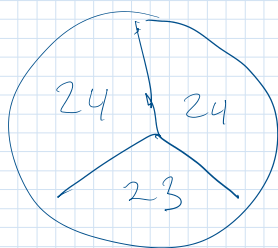
$$\bar{T} = 4 \text{ min}$$

$$A_c = \lambda \cdot \bar{T} = \frac{1}{2 \cdot 60} = \frac{1}{30} E$$

$$\# \text{ usuarios Celda} = S \cdot \text{Area Celda} = 1800 \text{ usuarios}$$

$$A = A_c \cdot \# \text{ usuarios} = \frac{1}{30} \cdot 1800 = \underline{60 E}$$

b.



$$\frac{71 \text{ canales}}{3} \approx 24$$

$$\frac{360^\circ}{3} = 120^\circ$$

c. Para 24 y 0.02

$$A = ?$$

$$A = 16.6 E$$

$$A_{\text{total}} = 32.4 E$$

Para 23 y 0.02

$$A = ?$$

$$A = 15.0 E$$

Comparar con el de arriba

5.

$$N = 7 \frac{\text{celdas}}{\text{cluster}}$$

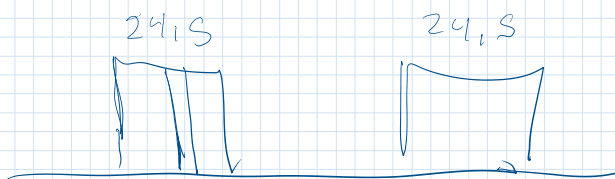
$$S = 100 \frac{\text{user}}{\text{km}^2}$$

$$AB = 49 \text{ MHz}$$

$$Vt_x = 10 \text{ kbps}$$

$$\eta = \frac{1 \text{ bps}}{\text{Hz}}$$

a.



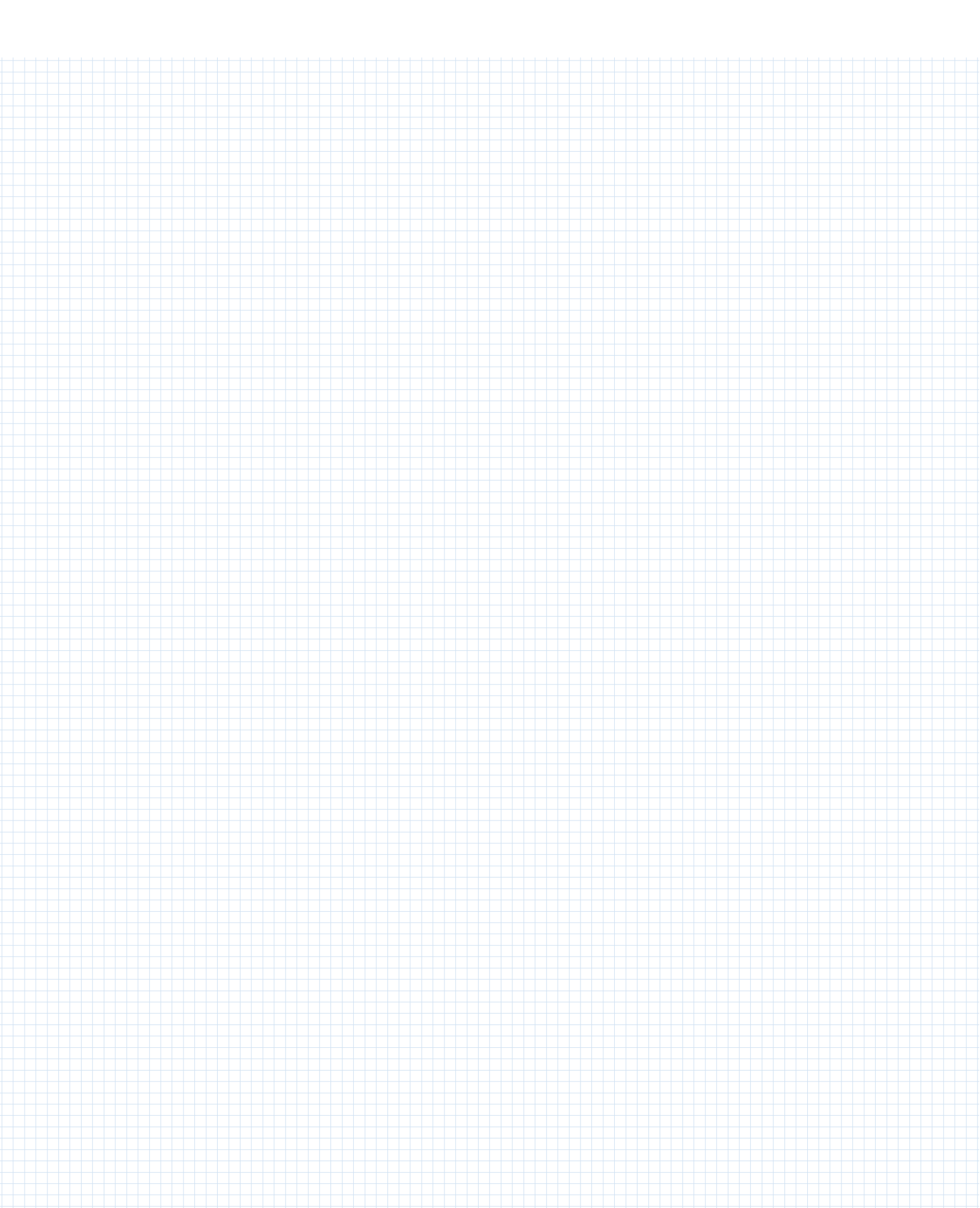
$$AB = \underline{24.5 \text{ MHz}}$$

$$\eta = \frac{Vt_x}{AB}$$

$$\Rightarrow AB = \frac{Vt_x}{\eta} = \frac{10 \text{ kbps}}{1 \text{ bps/Hz}}$$

$$AB = 10 \text{ kHz}$$

$$\# \text{ canales frecuencia} = \frac{24500}{10} = 2450 \frac{\text{canales}}{\text{cel./1.}}$$



$$\eta = \frac{1 \text{ bps}}{\text{Hz}}$$

$$\text{11 canales frecuencia} = \frac{241500}{10} = 24150 \frac{\text{canales}}{\text{celda}}$$

$$\frac{24150 \frac{\text{canales}}{\text{celda}}}{7 \frac{\text{celdas}}{\text{cluster}}} = 350$$

$$\frac{\text{canales}}{\text{celda}} \rightarrow \frac{\text{celdas}}{\text{cluster}}$$

$$\text{Area} = \frac{1}{\delta} =$$

$$\text{Km}^2$$

$$\text{Area} = \pi R^2$$

$$R = \sqrt{\frac{1}{2.59}} =$$

$$R^2 = \frac{\text{Area}}{2.59}$$

b.

$$AB = 49 \text{ MHz}$$

$$\# \text{ canales} = 350$$

$$AB_{\text{canal}} = \frac{AB}{\# \text{ canales}} = \frac{49 \text{ MHz}}{350} = 140 \text{ kHz}$$

$$\eta = \frac{V_{tx}}{AB_{\text{canal}}}$$

$$\# \text{ canales} = \frac{AB}{AB_{\text{canal}}}$$

$$V_{tx} = \eta \cdot AB_{\text{canal}} = 140 \text{ kbps}$$

