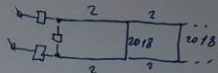
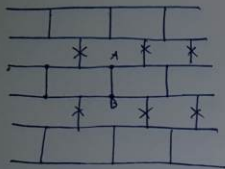


Problem No. 1.

1) Maximum Resistance.



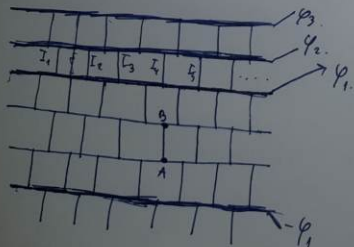
$$\frac{x \cdot 2018}{x + 2018} + 4 = x \quad x = 92.$$

$$x = 96.$$

and ~~max~~ Max $p = \frac{96 \cdot 2018}{96 + 2018} \approx \boxed{45} = 45 \Omega$

2) Minimum Resistance.

resistance of shaded was 0. this will reduce whole resistance.



$$I_1 + I_2 + I_3 + I_4 + \dots + I_n = 0$$

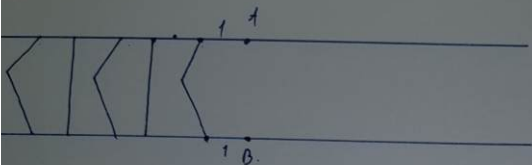
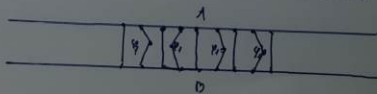
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$$\phi_1 = \phi_2 = \phi_3 = \dots = \phi_n \quad \phi_n = 0 \Rightarrow$$

$$\phi_1 = 0 = -\phi_1$$

(as much current flows upwards as much flows downwards)

and now we have circuit.



$$X_{AB} = \left(\frac{x \cdot 2018}{x + 2018} + 2 \right) \frac{4036}{4036 + \frac{x \cdot 2018}{x + 2018}} + 2$$

$$+ = 74$$

$$\frac{x}{2} = 37.$$

and whole resistance = $\frac{37 \cdot 2018}{37 + 2018} \approx 36 \Omega$

$$r = 36 \Omega$$

$$R = 95 \Omega$$

$$36 \Omega \leq p \leq 95 \Omega$$

$$\frac{R}{r} \leq 2.$$