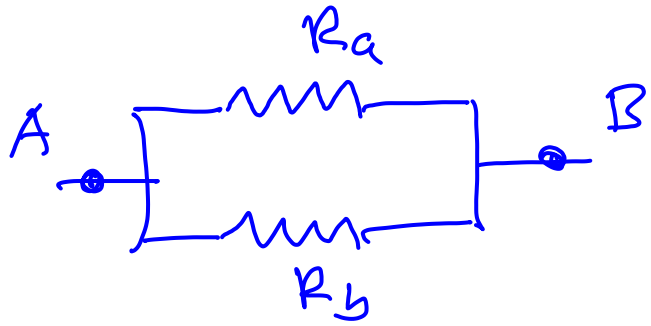
Prob. 6.1

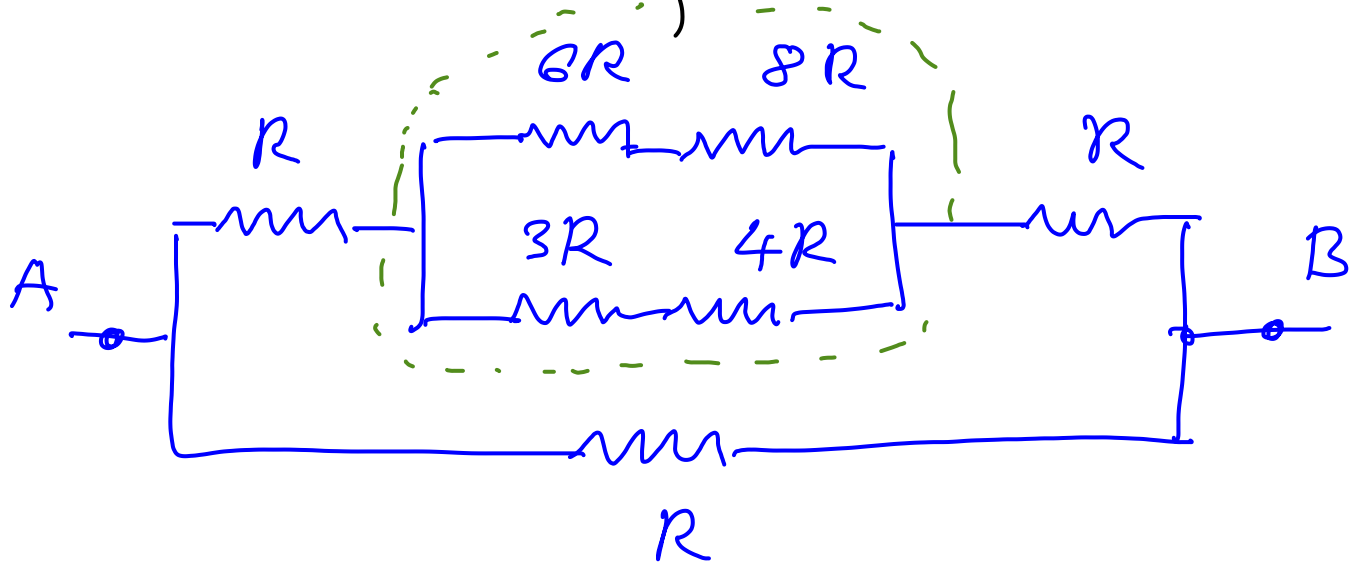
Para calcular la resistencia equivalente aplicamos las reglas de asociación de las mismas en serie y paralelo

$$R_{AB} = R_a + R_b$$

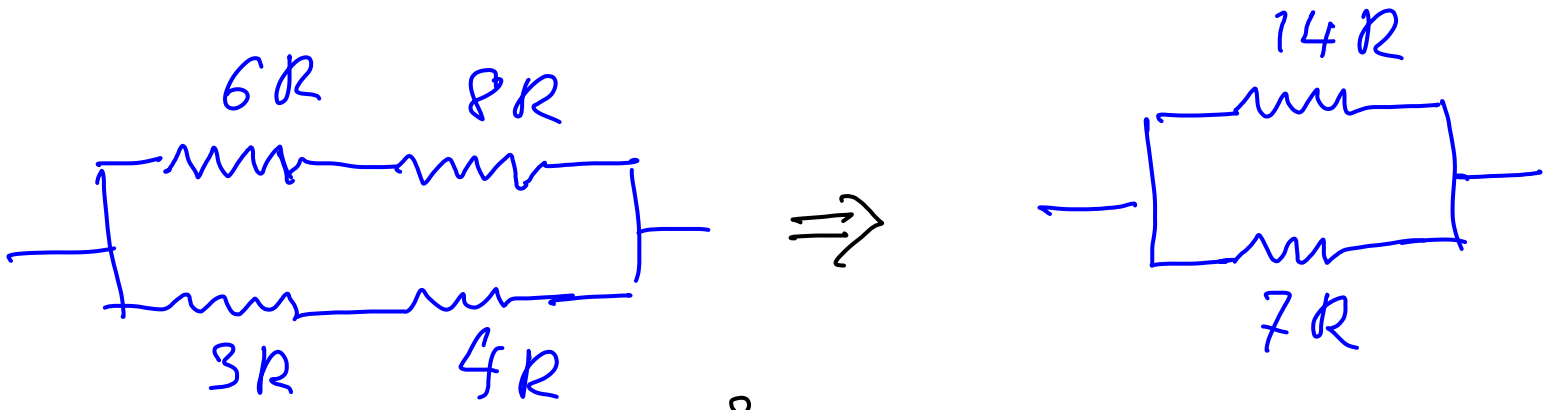


$$\frac{1}{R_{AB}} = \frac{1}{R_a} + \frac{1}{R_b} \qquad R_{AB} = \frac{R_A R_B}{R_A + R_B}$$

(a) El circuito del problema es el del dibujo

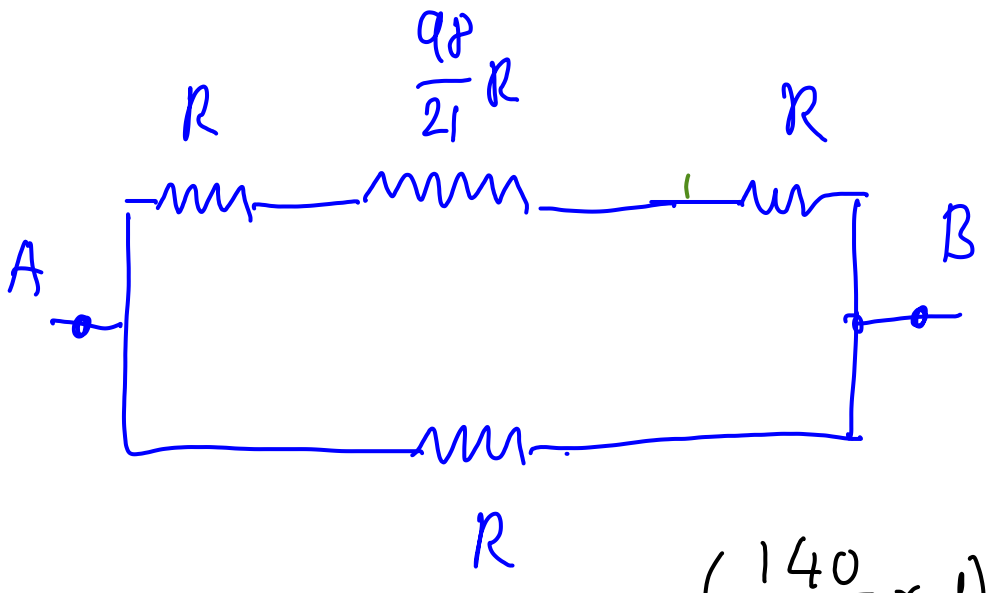


Comenzamos por la parte indicada en verde:

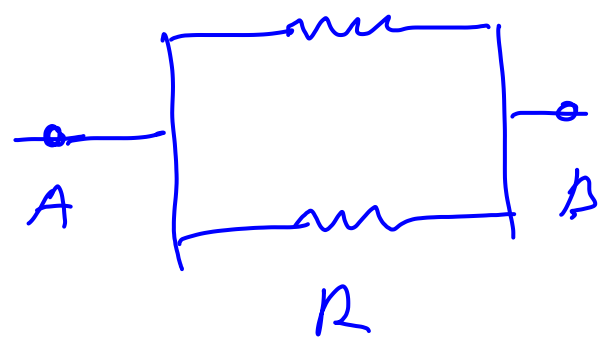


Luego $R_{eq} = \frac{14 \times 7R^2}{(7+14)R} = \frac{98}{21}R$

Con esto el circuito se reduce al siguiente:



$\Rightarrow$

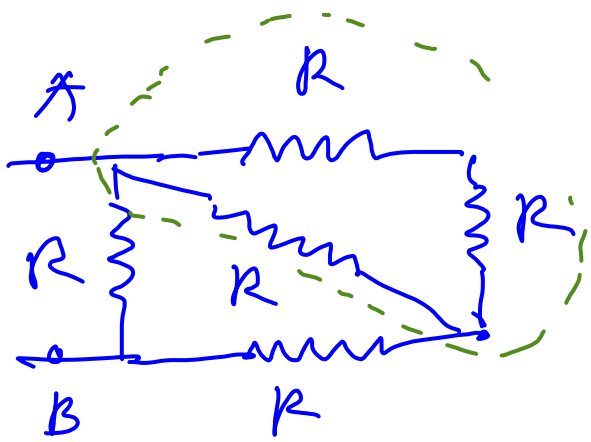


$$\left(2+\frac{98}{21}\right)R = \frac{140}{21}R$$

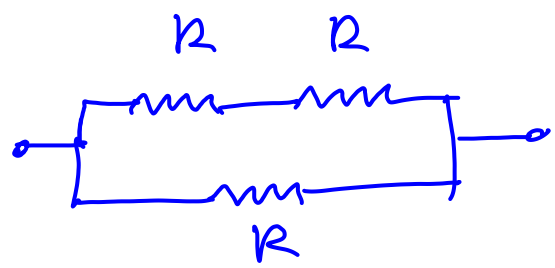
y queda $$R_{AB} = \frac{\left(\frac{140}{21}\times 1\right)R^2}{\left(\frac{140}{2}+1\right)R} = R\,\frac{140/21}{161/21} = \frac{140}{161}R$$

$$R_{AB} = \frac{20\times 7}{23\times 7}R = \frac{20}{23}R$$

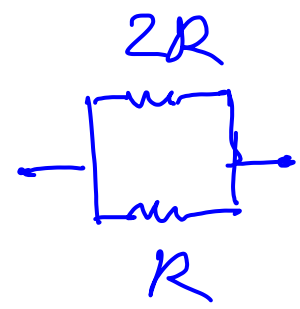
(B) En el circuito del esquema comentamos por la parte señalada en verde.



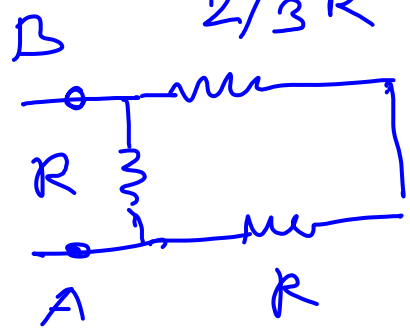
$\Rightarrow$



$\Rightarrow$

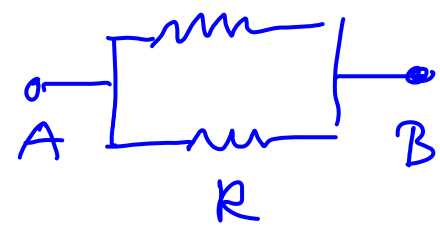


$$R_{eq} = \frac{2R^2}{(2+1)R} = \frac{2}{3}R$$



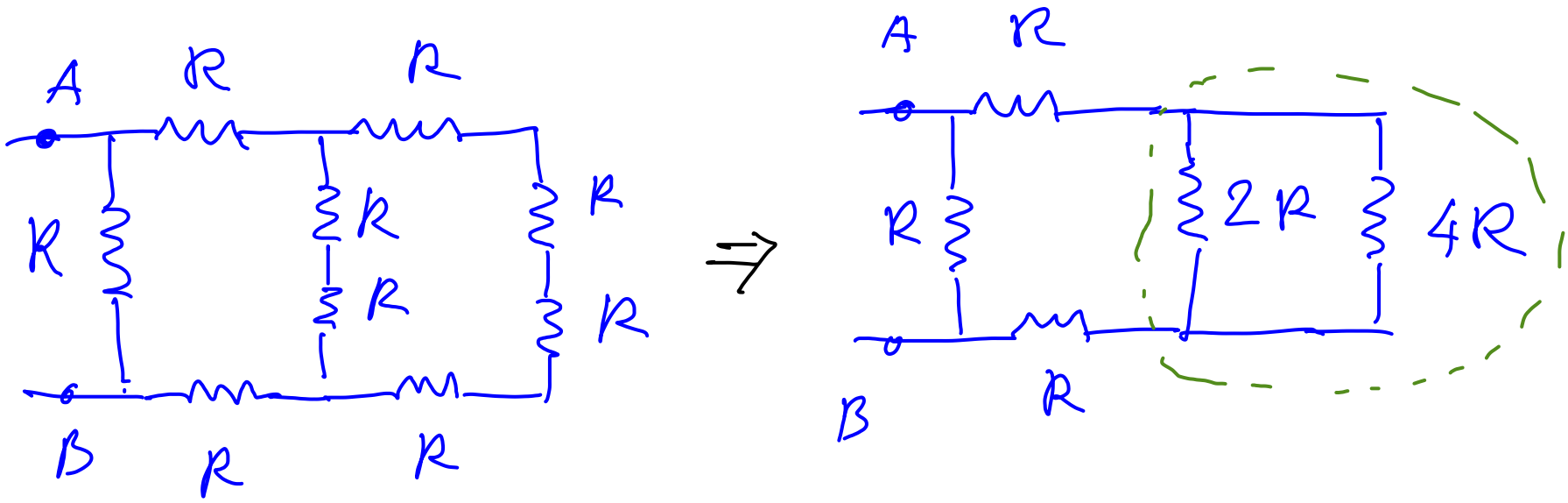
$\Rightarrow$

$$\left(\tfrac{2}{3}+1\right)R = \frac{5}{3}R$$

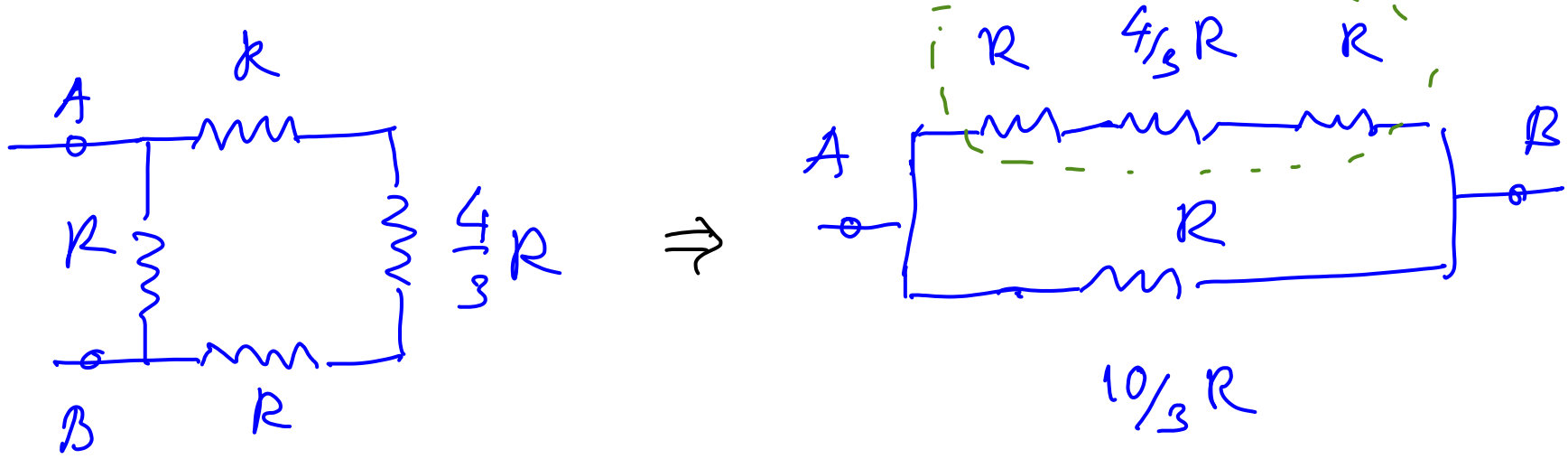


$$R_{AB} = \frac{\frac{5}{3}R^2}{(\frac{5}{3}+1)R} = \frac{5/3}{8/3}R = \frac{5}{8}R$$

(C) Para el último esquema tenemos



$$R_{eq} = \frac{2\times 4\ R^2}{(2+4)R} = \frac{8}{6}R = \frac{4}{3}R$$



$$R_{eq} = (2+\frac{4}{3}R) = \frac{10}{3}R$$

$$R_{AB} = \frac{(\frac{10}{3}\times 1)R^2}{(\frac{10}{3}+1)R} = \frac{10/3}{13/3}R = \frac{10}{13}R$$