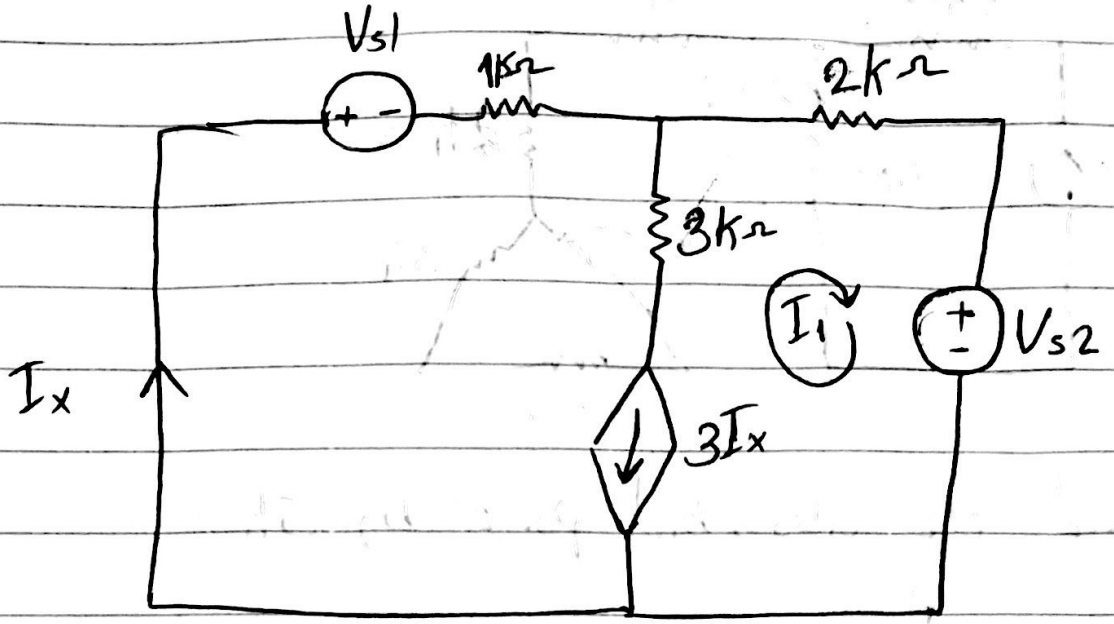
Q



$V_{s1} = 5V$ $V_{s2} = -12.5V$ find I_1 using mesh analysis.

Supermesh $\rightarrow 5 + I_x + 2I_1 = 12.5$

$I_x + 2I_1 = 7.5$ ..... ①

inside supermesh $\rightarrow I_x - I_1 = 3I_x$

$I_1 = -2I_x$ ..... ②

② in ① $\rightarrow I_x + 2(-2I_x) = 7.5$

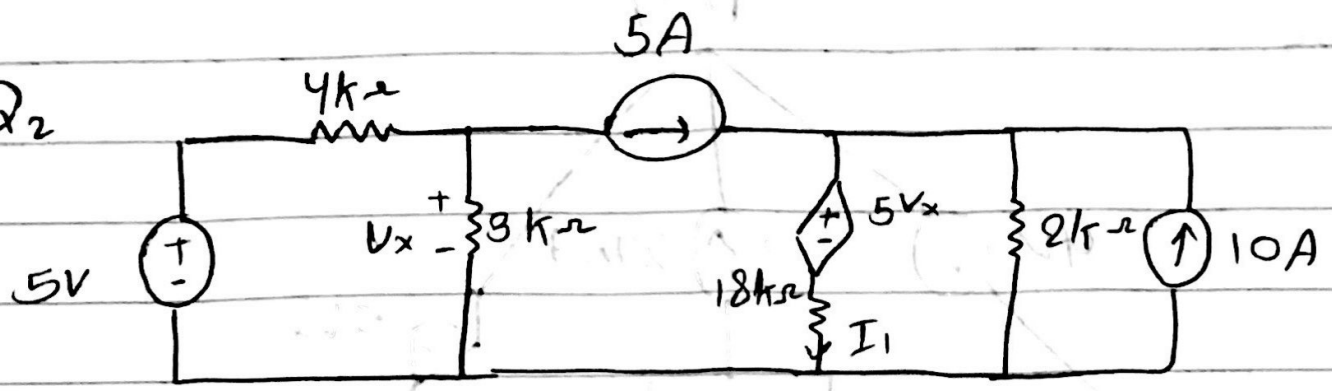
$I_x - 4I_x = 7.5$

$-3I_x = 7.5$

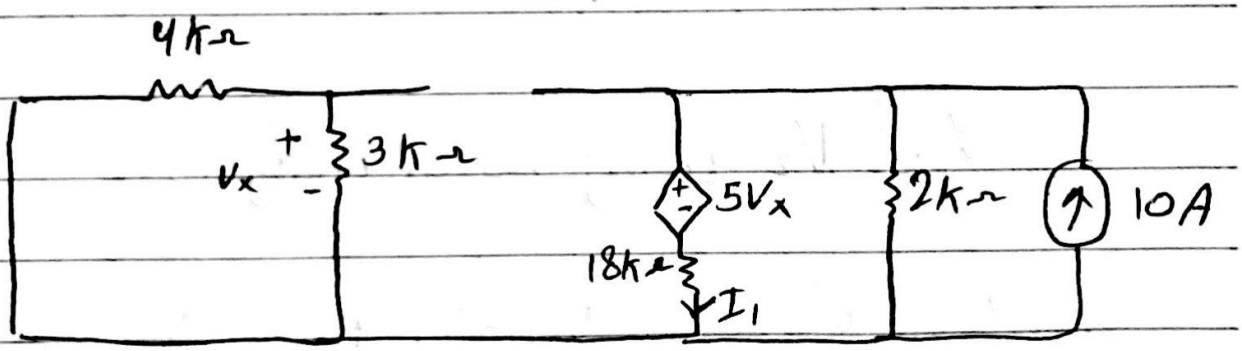
$I_x = -2.5$

from ② $\rightarrow I_1 = -2(-2.5) = 5mA$ #

Q_2



find the contribution of (10A) only in the value of I_1

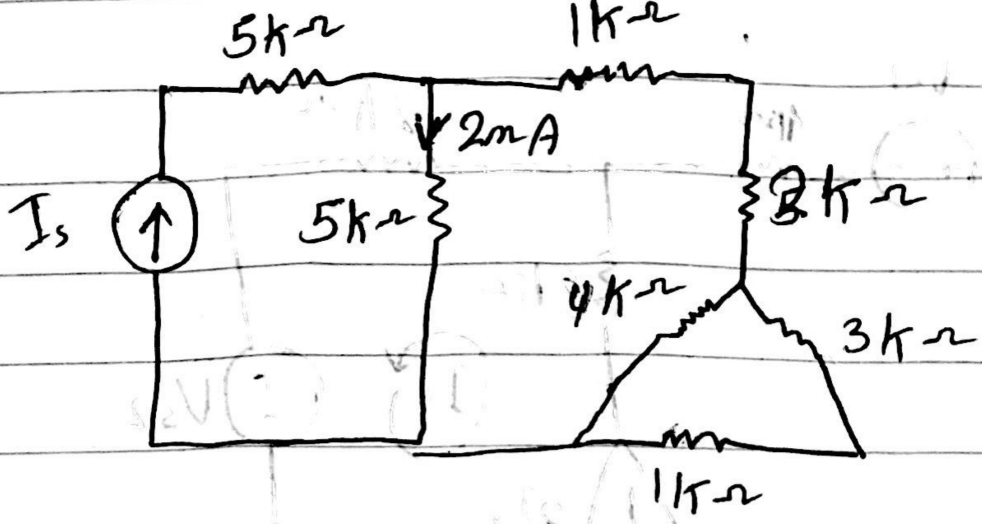


* kill 5A and 5V sources.

Current division →

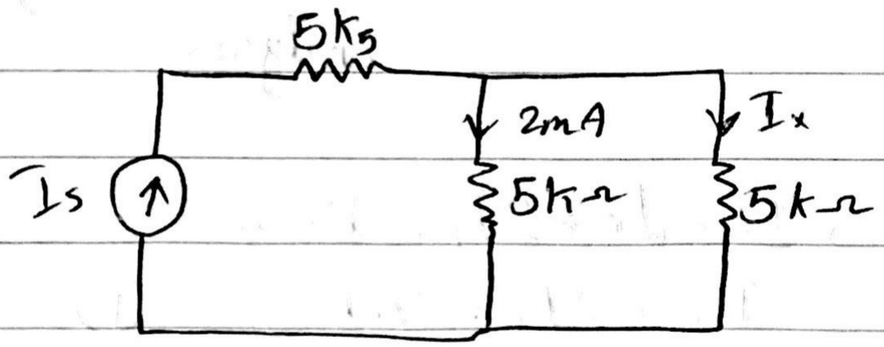
$$10 \frac{2}{18+2} = \frac{20}{20} = \boxed{1A}$$

Q3



- find the absorbed power by 5kΩ.

$3 + 1 = 4 // 4 = 2 + 2 + 1 = 5$



5//5 → اكبر متساوي = 10V

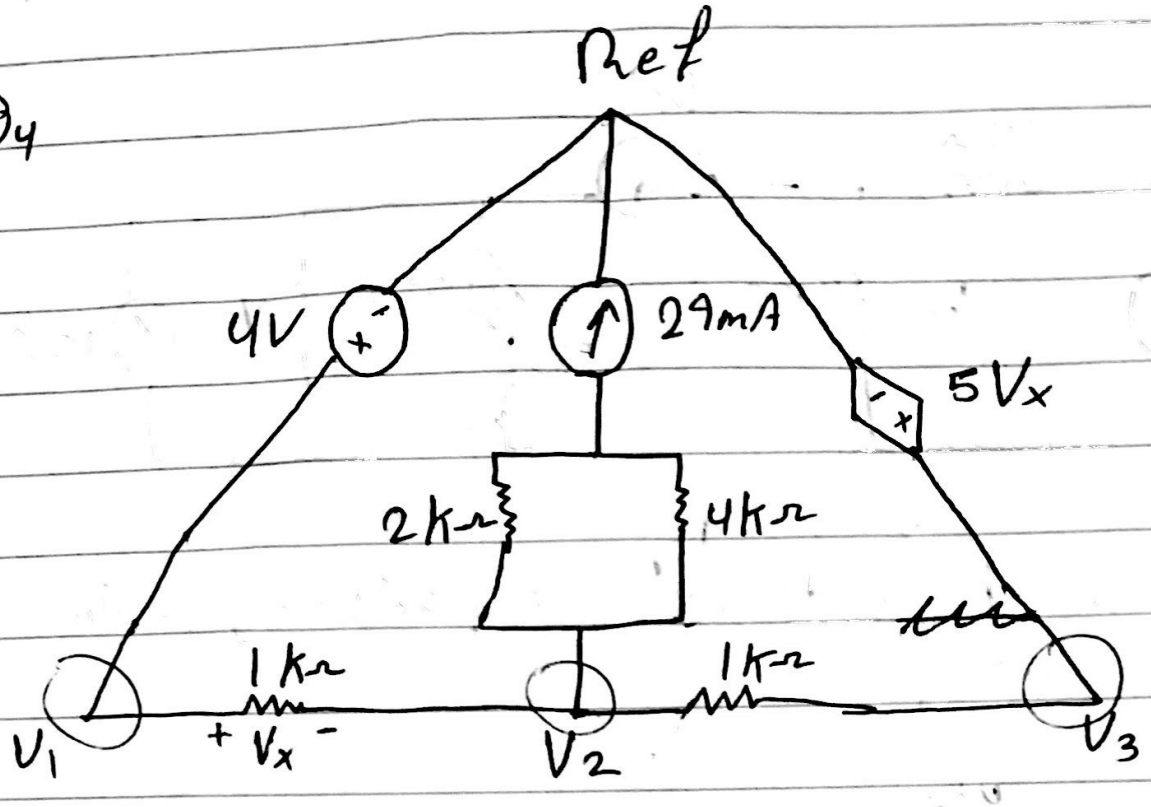
$I_x = \frac{10V}{5} = 2$

$I_s = 2 + 2 = 4A$

$P = I^2 R$

$= 16 \times 5 = 80 mW$

Q4



- find V_2 using nodal analysis.

KCL at V_2 → $V_2 - V_1 + V_2 - V_3 + 29 = 0$

$2V_2 - V_3 - 4 + 29 = 0$

$2V_2 - V_3 = -25$ ... ①

KCL at V_3 → $V_3 - 5V_x = 0$

$V_3 - 5(4 - V_2) = 0$ $\boxed{V_x = V_1 - V_2}$

$V_3 - 20 + 5V_2 = 0$

$V_3 + 5V_2 = 20$ ... ②

$2V_2 - V_3 = -25$

$V_3 + 5V_2 = 20$

$7V_2 = -5$

$\boxed{V_2 = \frac{-5}{7}}$