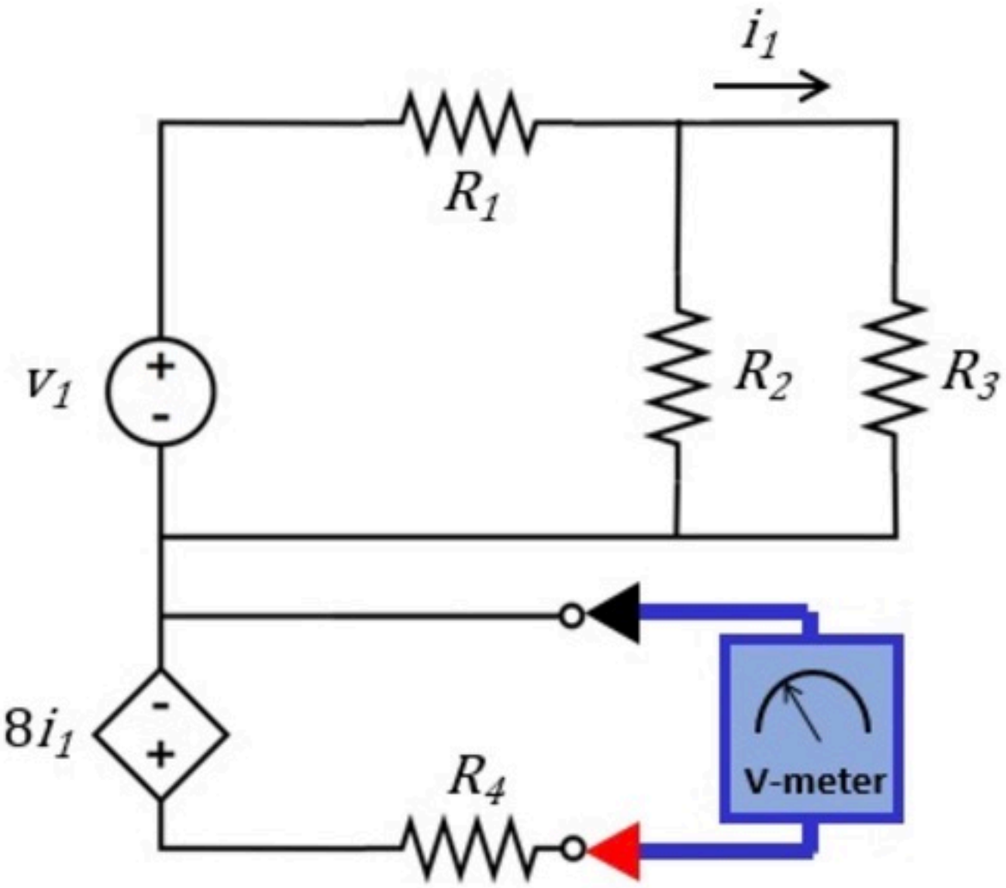
Basic analysis 008

Problem has been graded.

Find the volt meter reading X.



Given Variables:

v1 : 20 V

R1 : 10 ohm

R2 : 15 ohm

R3 : 10 ohm

R4 : 20 ohm

Calculate the following:

X (V) :

Hint: Mind the direction of the V meter

Find the volt meter reading X.

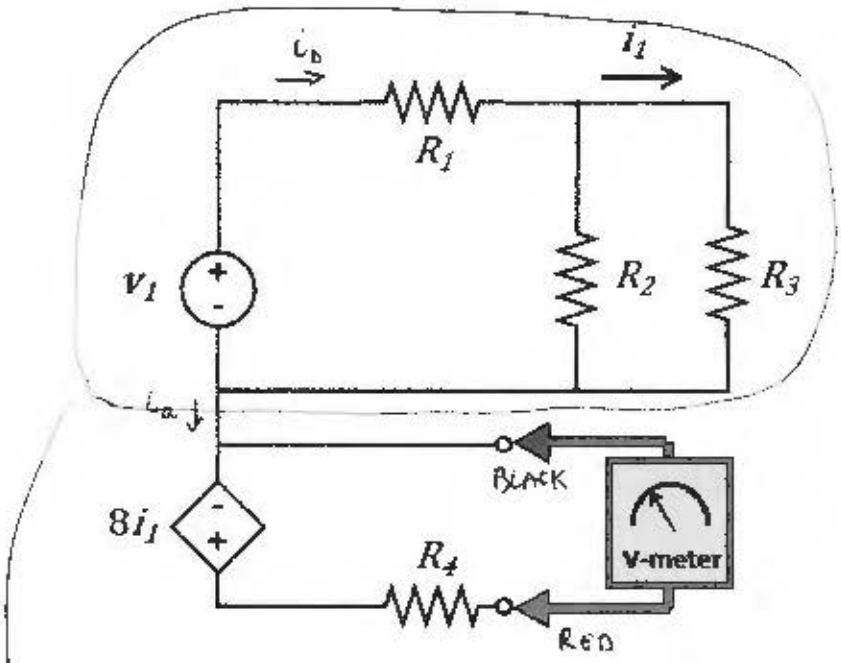
v1 = 10 V

R1 = 10 Ω

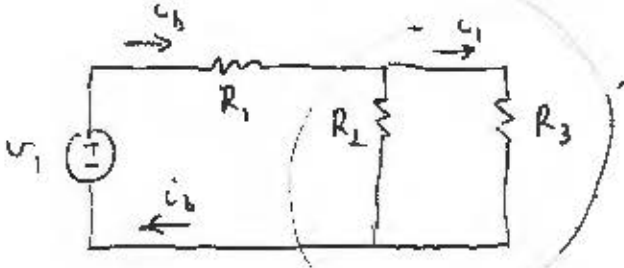
R2 = 15 Ω

R3 = 10 Ω

R4 = 10 Ω



GENERALIZED KCL : $i_a = 0$



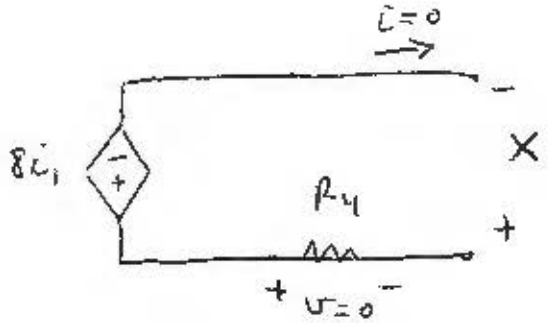
$$R_2 // R_3 = \left(\frac{1}{15} + \frac{1}{10}\right)^{-1}$$

$$= \left(\frac{1}{5} \cdot \left(\frac{1}{3} + \frac{1}{2}\right)\right)^{-1}$$

$$= \left(\frac{1}{5} \cdot \frac{5}{6}\right)^{-1} = 6\ \Omega$$

$$i_b = \frac{v_1}{R_1 + R_2 // R_3} = \frac{10}{10 + 6} = \frac{10}{16}$$

CURRENT DIVIDER. $i_1 = i_b \dfrac{R_2}{R_2 + R_3} = \dfrac{\cancel{10}^{2}}{16_{8}} \cdot \dfrac{\overset{3}{\cancel{15}}}{\cancel{25}_{8}} = \dfrac{3}{8}$



$$\Rightarrow X = 8 i_1 = 8 \cdot \frac{3}{8}$$

$$\boxed{X = 3\,V}$$