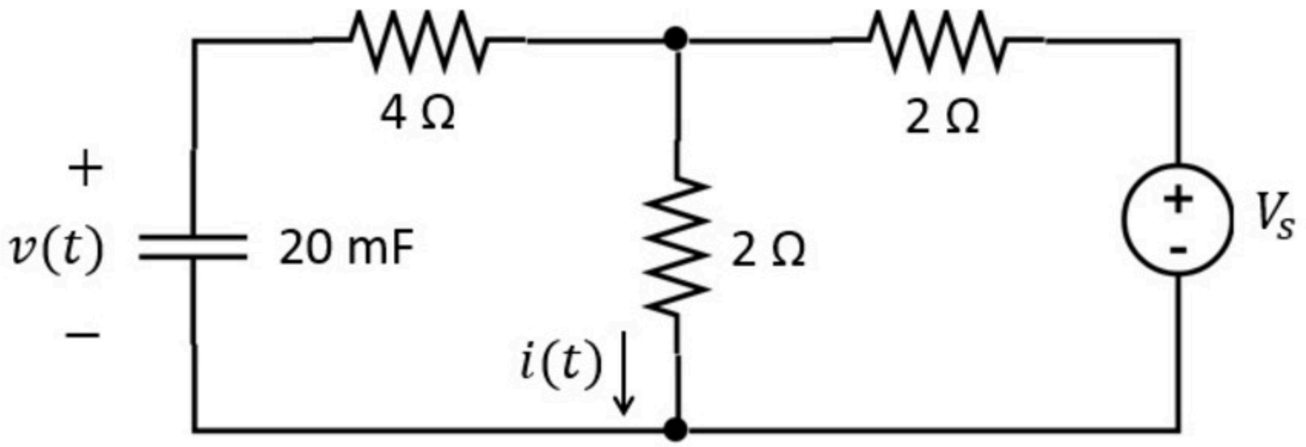
First order circuits 001

Problem has been graded.

Given a voltage $v(t)$, find the current $i(t)$.

$$v(t) = A_1 + B_1 \cdot e^{-10t}$$

$$i(t) = A_2 + B_2 \cdot e^{-10t}$$



Given Variables:

A1 : 10 V

B1 : 10 V

Vs : 20 V

Calculate the following:

A2 (A) :

5 ✓

B2 (A) :

1 ✓

Given a voltage $v(t)$, find the current $i(t)$.

$$v(t) = A_1 + B_1 \cdot e^{-10t}$$

$$i(t) = A_2 + B_2 \cdot e^{-10t}$$

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B1 : 10 V

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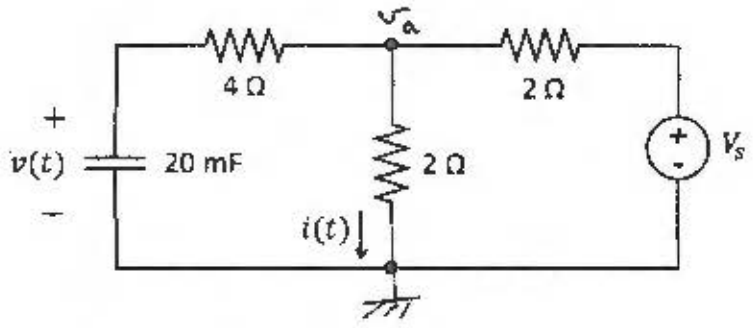

NODAL

$$\frac{v_a - v}{4} + \frac{v_a - V_s}{2} + \frac{v_a}{2} = 0$$

$$v_a - v + 2(v_a - V_s) + 2v_a = 0$$

$$5v_a = v + 2V_s$$

$$v_a = \frac{v}{5} + \frac{2V_s}{5}$$

$$i = \frac{v_a}{2} = \frac{v}{10} + \frac{V_s}{5} = 1 + e^{-10t} + 4$$

$$\boxed{A_2 = 5\ A}$$

$$\boxed{B_2 = 1\ A}$$