SHOW ALL WORK!!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

After being open for a long time, the switch in this circuit is closed for 0.500 s; it is then opened at t = 0. If you cannot get the time constant in (a), use a symbol \( \tau \) for the time constant in (a) and (b).

(a) Calculate the current in the inductor at \( t = 0 \)
(b) Calculate the current in the inductor at \( t = 0.100 \) s. Do not use a symbol for this second time constant.

\[ R_1 = 100 \, \Omega; \quad R_2 = 200 \, \Omega; \quad L = 15.0 \, \text{H}; \quad \varepsilon = 175 \, \text{V} \]

\[ I_1 R_1 + I_2 R_2 = \varepsilon \quad \text{with initial condition} \quad t=0, \quad I_L=0 \]

\[ I_1 = I_2 + R_L \]

\[ I_2 R_2 = L \frac{dI_L}{dt} \]

Solve it we get \( I_L = \frac{\varepsilon}{R_1} (1 - e^{-\frac{R_1 R_2}{(R_1 + R_2) L} t}) \)

After 0.5 s, \( I_L = \frac{175}{100} (1 - e^{-\frac{100 \times 200}{(100 + 200) \times 15} \times 0.5}) = 1.56 \) A

When \( s \) is opened at \( t=0 \), \( I_L = 1.56 \) A

(b) The equivalent circuit is Fig. 1. So we have \( I = I_0 e^{-\frac{R_2}{L} t} \), where \( I_0 = 1.56 \) A

Thus \( I = 1.56 \times e^{-\frac{200}{1500} \times 0.1} = 0.41 \) A