1. (30 pts) The switch has been open (not making contact) for a long time and is switched closed (as shown) at time $t = 0$.

a) Find the complete expression for $v_C(t)$.

b) What is $v_C(t)$ when $t = \tau$? $v_C(\tau) =$

c) At time $t = \tau$ the switch is opened again. Find the complete expression for $v_C(t')$, where $t'$ starts at $t = \tau$. Be sure to clearly show the time constant.
Problems are out-of-order

3. (30 pts) For partial credit, you must show work and/or intermediate results.
   a) Find $I_2$

   $I_S := (45 - 30j) \text{ mA}$
   $V_R := 3V \cdot e^{j30 \text{ degree}}$
   $R := 100 \Omega$
   $Z_2 := (80 + 120j) \Omega$

   b) Find $V_S$

   c) Find $I_1$ in polar form.

   d) Find $Z_1$ in any form.

Answers
1. a) $15 \cdot V - 5.4 \cdot V \cdot e^{-\frac{1}{0.15 \text{ ms}}}$
   b) $13.0 \cdot V$
   c) $9.6 \cdot V + 3.4 \cdot V \cdot e^{-\frac{t}{0.24 \text{ ms}}}$
   d) $i_C (\text{mA})$

2. $211 \Omega / -31.43^\circ$

3. a) $25.98 - 15j \text{ mA}$
   b) $6.48 + 0.418j \text{ V} = 6.49 \cdot V \cdot e^{j3.69 \text{ degree}}$
   c) $24.2 \text{ mA} \cdot e^{j38.3 \text{ degree}}$
   d) $199.3 + 179.1j \Omega = 268 \Omega \cdot e^{j41.95 \text{ degree}}$

Remember to put $I_1$ in polar form

d) Find $Z_1$ in any form.