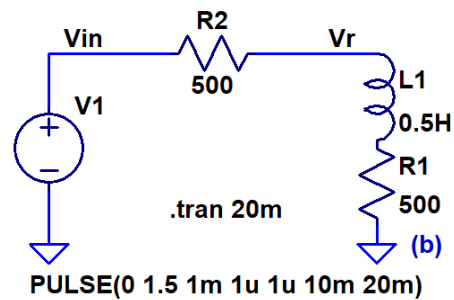
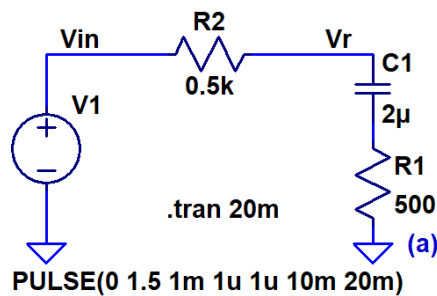


Show your work for credit!

- Design a circuit that creates a triangle waveform that swings between  $-5$  and  $+5$  V at 1 kHz. Assume the input to the circuit is a square-wave that oscillates at 1 kHz between  $-1$  and  $+1$  V. Show your hand calculations for credit. Verify your design using LTSpice. (4 points)
- Calculate the RMS value of a square wave that oscillates between  $-V_p$  and  $+V_p$ . Assume the square wave has a 50% duty cycle, that is, it is at  $+V_p$  the same amount of time it is at  $-V_p$ . (3 points)
- Write equations for  $V_r$ , and sketch along with  $V_{in}$ , in the following circuits. Verify your answers with LTSpice. (2 points)



- Determine  $V_{out}$  for each of the following circuits. Sketch  $V_{out}$  and  $V_{in}$  on the same plot. Show your hand calculations for credit. Verify your answers using LTSpice. (8 points)

