In all practice problems: unless a change is specified, use the original value.

1. Redo practice problem 11.1 in Alexander and Sadiku, 5h Edition with $v(t) = 130\cos(8t + 25^o)$ V and $i(t) = 15\sin(8t + 50^o)$ A.
2. Redo practice problem 11.4 in Alexander and Sadiku, 5h Edition with 8 Ω replaced by 10 Ω, $-j2$ Ohm replaced by $-j3$ Ohm and $j4$ Ohm replaced by $j5$ Ohm.
3. Redo practice problem 11.7 in Alexander and Sadiku, 5h Edition with 9 Ω replaced by 7 Ω and the peak current of the triangular waveform set to 9 A instead of 8 A.
4. Consider the periodic voltage waveform $v(t)$ shown in Figure 1. Find the following:
   a) Period
   b) Frequency in radians/sec
   c) DC (or average) voltage
   d) RMS voltage

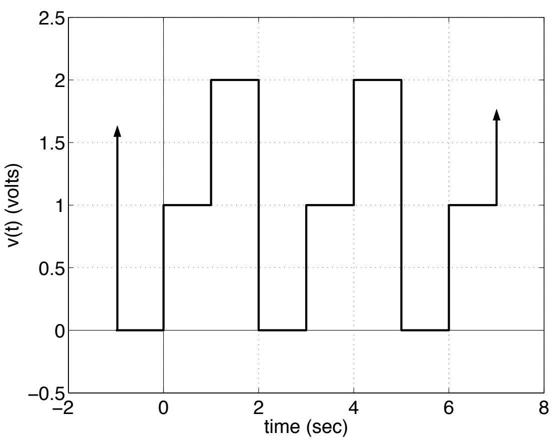

Figure 1 Time domain waveform $v(t)$.

5. Redo practice problem 11.10 in Alexander and Sadiku, 5h Edition with component values changed as follows: $120 \rightarrow 150$, $10 \rightarrow 8$, $8 \rightarrow 9$, $j4 \rightarrow j3$, $-j6 \rightarrow -j5$.
6. A memory chip has a capacity of 1 GiB (8×2^{30} bits) and measures $5 \times 6\,\text{mm}^2$. Calculate the width in μm of an individual memory cell (storing 1 bit). Assume that the width and height of cells are equal and that the entire chip area is occupied by memory cells.

   By comparison, a typical "cell" in life tissue has 10 μm diameter. How many memory cells would fit into the area occupied by such a cell? Assume the cell is round.
7. The size of individual "pixels" of modern camera chips such as those used in smart phones is 2.5 μm per side. What is the size of an imager with 4096 by 2160 pixels (4k resolution)? Assume that the entire chip area is occupied by pixels.

   By comparison, each frame of 32 mm film measures approximately $34 \times 23\,\text{mm}^2$. How many 2.5 μm pixels fit into this area?
8. All of 10^5 total transistors in a chip have to be functional for the chip to function (and be sellable). Calculate the maximum probability for each transitor to be defective to achieve 80 percent yield. Yield is the fraction of chips that are functional. Assume that failures of individual transistors are uncorrelated.