1. (Sauer §0.2, #4) Convert the following base 10 numbers to binary. Use overbar notation for nonterminating binary numbers.
   (a) 11.25
   (b) 2/3
   (c) 3/5
   (d) 3.2
   (e) 30.6
   (f) 99.9

2. (Sauer §0.2, #8) Convert the following binary numbers to base 10.
   (a) 11011
   (b) 110111.001
   (c) $111.\overline{001}$
   (d) $1010.\overline{01}$
   (e) $10111.1\overline{0101}$
   (f) $1111.010\overline{001}$

3. (Sauer §0.3, #2) Convert the following base 10 numbers to binary and express each as a floating point number $\mathrm{fl}(x)$ by using the Rounding to Nearest Rule.
   (a) 9.5
   (b) 9.6
   (c) 100.2
   (d) 44/7

4. (Sauer §0.3, #4) Find the largest integer k for which $\mathrm{fl}(19 + 2^{-k}) > \mathrm{fl}(19)$ in double precision floating point arithmetic.

5. (Sauer §0.3, #11) Does the associative law hold for IEEE computer addition? Explain your response.

6. (Sauer §0.4, #1) Identify for which values of x there is subtraction of nearly equal numbers, and find an alternate form that avoids the problem.
   (a) $\dfrac{1 - \sec(x)}{\tan^2(x)}$
   (b) $\dfrac{1 - (1 - x)^3}{x}$
   (c) $\dfrac{1}{1 + x} - \dfrac{1}{1 - x}$