1. Let $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 0 & 1 \end{pmatrix}$, $C = \begin{pmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{pmatrix}$. Compute $2A$, $-4A$, $\frac{B}{3}$, B^T, $B+B^T$, AC, CB, ACB, A^2, B^2, CC^T, $-tA$, t^2B, $t^2B - tB^T$.

2. Work on Problems 1, 4, 6, 7, 9, 10, 11–14 of Section A.1 in the textbook.

3. Prove that matrix multiplication (with matrix addition) is distributive.

4. Only three brands of beer (beer 1, 2, and 3) are available for sale in Melbornolis. From time to time, people try one or another of these brands. Suppose that at the end of each month, people change the beer they are drinking according to the following rules: 30% of the people who drink beer 1 switch to beer 2, 40% switch to beer 3; 20% of beer 2 drinkers switch to beer 1, 50% to beer 3; 50% of beer 3 drinkers switch to beer 1, 5% to beer 2. Let x be the vector consisting of x_i (number of people drinking beer i at the beginning of the first month) and y be the vector consisting of y_i (number of people drinking beer i at the beginning of the second month). Relate the vectors x and y using matrices. If z is the vector consisting of z_i (number of people drinking beer i at the beginning of the third month), relate y and z. Also relate x and z.

5. Work on Problems 25–30 of Section A.1 in the textbook.