1. (14 points) For the function $f(x) = -2 - xe^{-x+2}$
   a) find the intervals of monotonicity and local extrema;
   b) find the intervals of concavity and inflection points;
   c) find the asymptotes;
   d) draw the graph of f.

2. (6 points) Calculate $\int \dfrac{x-1}{(3x+2)^4}\,dx$.

3. (7 points) Find the area between the curves $y = -2x^2 + 8x + 5$ and $y = x^2 - 4x - 10$ over the interval [3, 6]. Draw the graph.

4. (8 points) a) Using Cramer's Rule, solve the system

$$
\begin{array}{rcrcr}
-4x & + & 5y & = & -13, \\
2x & - & 4y & = & 8.
\end{array}
$$

   b) Solve the matrix equation $XA = C$ where $A = \begin{pmatrix} 2 & 4 \\ 3 & 8 \end{pmatrix}$ and $C = \begin{pmatrix} 3 & 1 \\ -2 & 6 \\ -1 & 5 \end{pmatrix}$.

5. (5 points) Find the intersection point and equations of the following two lines. The first line passes through the point (3, 1) and has x-intercept 4. The second line is perpendicular to the line $y = \dfrac{1}{2}x - 8$ and passes through the point (4, -5). Graph the lines in the same coordinate system.