Due: Wednesday, 8/29/01

Perform the indicated matrix multiplication for each problem. Substitute the angles and dimension values given. Use at most 3 significant digits in your answers.

Show the final answer is valid with a correctly scaled sketch for each problem. Use a scale 1 inch = 1 unit OR 25 mm = 1 unit for all sketches

1. q = 30 degrees, x_1 = 2 units, y_1 = 3 units,

$$\underline{R} = \begin{bmatrix} x_0 \\ y_0 \\ 1 \end{bmatrix} = \begin{bmatrix} \cos q & -\sin q & 0 \\ \sin q & \cos q & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

2. q = -45 degrees, x_1 = -1 unit, y_1 = 4 units,

$$\underline{R} = \begin{bmatrix} x_0 \\ y_0 \\ 1 \end{bmatrix} = \begin{bmatrix} \cos q & -\sin q & 0 \\ \sin q & \cos q & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

3. a_1 = -1 unit, b_1 = -2 units, x_1 = 2 unit, y_1 = 3 units,

$$\underline{R} = \begin{bmatrix} x_0 \\ y_0 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & a_1 \\ 0 & 1 & b_1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

4. a_1 = 1 unit, b_1 = 2 units, x_1 = -1 unit, y_1 = 4 units,

$$\underline{R} = \begin{bmatrix} x_0 \\ y_0 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & a_1 \\ 0 & 1 & b_1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

5. q = 30 degrees, a_1 = 1 unit, b_1 = 2 units, x_1 = -1 unit, y_1 = 4 units,

$$\underline{R} = \begin{bmatrix} x_0 \\ y_0 \\ 1 \end{bmatrix} = \begin{bmatrix} \cos q_1 & -\sin q_1 & a_1 \\ \sin q_1 & \cos q_1 & b_1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$