



MATH 140: WEEK-IN-REVIEW 1 (1.1 & 1.2)

1.

$$A = \begin{bmatrix} 2 & 3 \\ -2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 1 & 0 \\ -1 & -2 & 1 \end{bmatrix} \quad C = \begin{bmatrix} 3 & 1 \\ 0 & -1 \\ 2 & 4 \end{bmatrix} \quad D = \begin{bmatrix} 4 & 3 & 0 \\ 2 & -1 & 1 \end{bmatrix} \quad E = \begin{bmatrix} 2 & -2 & 4 \\ 4 & 1 & 0 \\ 0 & 2 & -1 \end{bmatrix}$$

(a) *Using the matrices above, determine whether or not the following operations are possible. If the operation is possible, give the size (dimensions) of the resulting matrix and then perform the operation. If the operation is not possible, explain why not.*

(i) $5A$

(ii) $C + D$

(iii) D^T

(iv) $3B - C^T$



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(v) AB

(vi) BA



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(vii) $3BCA$

(viii) Determine if $L = (EC)^T$ is possible. If possible, state the size of L and then find the entry ℓ_{23} .

(viii) Using the given matrices, determine the value of $2c_{32} - a_{21} + e_{13}$



2. Solve the following matrix equation for X . What is the size of X ?

$$7X + \begin{bmatrix} 3 & 1 \\ 0 & -1 \\ 2 & 4 \end{bmatrix} = 2X - \begin{bmatrix} -3 & -4 \\ 2 & 0 \\ 5 & 1 \end{bmatrix}$$

3. Solve the following matrix equations for w, x, y and z . If this is not possible, then explain why not.

(a)

$$\begin{bmatrix} (w+3) & 4 \\ -7 & z \end{bmatrix} + \begin{bmatrix} 2x & y \\ -5 & 1 \end{bmatrix}^T = \frac{1}{3} \begin{bmatrix} 12 & (x-6) \\ -18 & (4z-1) \end{bmatrix}$$



(b)

$$\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} -3x & 0 \\ 2 & 6 \end{bmatrix} - 2 \begin{bmatrix} (y+2) & x \\ 5 & (3z+5) \end{bmatrix} = \begin{bmatrix} -5 & -3w \\ 3x-1 & 14 \end{bmatrix}^T$$



4. In August before school starts, a bookstore sells 200 boxes of blue pens, 175 pencil sets, and 100 notebooks. In September, the bookstore sells 80 notebooks, 100 pencil sets, and 125 boxes of blue pens.

(a) Organize this information into a 3×2 matrix Q . Label all rows and columns.

(b) If the bookstore sells boxes of blue pens for \$5.00, notebooks for \$ 3.50, and pencil sets for \$ 7.00, write a matrix P that could be used to multiply matrix Q by, in order to have the August and September revenue from the three products. Again, label all rows and columns.

(c) How much revenue does the bookstore bring in, in August? In September?