Math 240 Names(s): _____

Review for Test #2

1. Express **w** = [9, 17, -6] as a linear combination of **u** = [3, 1, 0] and **v** = [2, -4, 2].

2. Find the angle between the vectors **u** = [3, 1, 0] and **v** = [2, -4, 2]

3. Let **u**, **v** and **w** be vectors in $\Re^n$. If **u** is perpendicular to both **v** and **w**, show that **u** is also perpendicular to 5**v** + **w**.

4. Let S be a set of vectors. What is the definition of the span of S?

For #5 and #6, Let A = $\begin{bmatrix} 2 & 1 \\ 0 & -1 \\ 3 & 2 \end{bmatrix}$ and B = $\begin{bmatrix} 3 & 0 \\ 1 & -2 \\ -1 & 4 \end{bmatrix}$

5. Find 2A + B

6. Compute $A^T A$

7. Use the Gauss-Jordan method (row operations) to solve the system of equations:

$$x_1 - 3x_2 + x_3 = 2$$
$$3x_1 - 8x_2 + 2x_3 = 5$$

8. Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 5 \\ 3 & 2 & 1 \end{bmatrix}$ (by hand)

9. Solve the system of equations: $\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 5 \\ 3 & 2 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 12 \\ 10 \end{bmatrix}$ (Hint: compare with #8)

10. As part of a board game, a player spins the spinner drawn below and moves his/her marker the appropriate number of places around the board. Construct the transition matrix for this game. (Hint: it is an 8X8 matrix, with 5 zeros in nearly every column).

Space A	Space B	Space C
Space H		Space D
Space G	Space F	Space E – If you land here, subtract 1 from your next spin