Dr. A. Betten Spring 2008

MATH 369 Linear Algebra

Midterm # 1

Problem # 1

Compute the angle between the vectors $\begin{pmatrix} 9 \\ 6 \\ -4 \end{pmatrix}$ and $\begin{pmatrix} -3 \\ 7 \\ 6 \end{pmatrix}$. Give your answer in degree.

Given the vector $\begin{pmatrix} 4 \\ 3 \\ 6 \end{pmatrix}$ Fill in the missing entry to make $\begin{pmatrix} 6 \\ -3 \\ \end{pmatrix}$ orthogonal to it.

Problem # 2

Determine a, b and c such that the parabola $y = ax^2 + bx + c$ passes through the points A, B and C.
$A(6, -3)$, $B(5, 9)$, $C(10, -41)$.

Problem # 3

Find the equation of two lines through A, one parallel and the other perpendicular to the line corresponding to the given equation.
$A(0, 6), 2x - 2y = 1$

Problem # 4

Find the distance from the line to the point.
$3x + y = 10; (-3, -1)$

Problem # 5

Which of these subsets of P_3 (polynomials of degree at most 2) are linearly dependent and which are linearly independent?
a) $\{3 - x + 9x^2, 5 - 6x + 3x^2, 1 + x - 5x^2\}$
b) $\{-x^2, 1 + 4x^2\}$
c) $\{2 + x + 7x^2, 3 - x + 2x^2, 4 - 3x^2\}$

Problem # 6

Is $\begin{pmatrix} 6 \\ -4 \\ 6 \end{pmatrix}$ in the span of the two vectors $\begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix}$ and $\begin{pmatrix} 1 \\ 2 \\ 4 \end{pmatrix}$.

Is $\begin{pmatrix} 10 \\ -30 \\ 4 \end{pmatrix}$ in the span of $\begin{pmatrix} 11 \\ -7 \\ 12 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 4 \\ 5 \end{pmatrix}$