Math 221 202 **(Take home) Quiz 8 Cover-sheet** **Score**

Your name _____ **Student #**

Due: Tuesday, March 12th, 2001 at 10.00am.

Ground Rules:

1. Donot pick up a quiz for any other person.
2. Please turn in the quiz in person as you enter the class (no later than 10.15 am).

3. Open book and notes. You may consult anyone you want, but you must write up your own solutions.
4. Show your work. Explain your solutions clearly.
5. When you submit the quiz back on Tuesday, please use this cover sheet as the first page.
6. The grader will choose two problems randomly (page 4) and grade them.
7. Maximum possible score will be 25. There will be 4 points for completion and 1 point for attaching this cover sheet. No points for turning in this cover sheet without the quiz.

It would be nice if you use the space below and the back of this page to answer the problems (page 4). It will minmize my/our contributions to global warming.

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Total	

[1] **Office hours:** Monday 1:30pm-3pm, 5pm-6pm, Wednesday 2:30pm-3:30pm, Thursday at 1:30pm-3:00pm, Friday 11:30am-12:30pm or by appointment.

Overview of Sections: 5.1,5.2,5.3,5.4

1. **Vocabulary List:**
   (a) Eigenvalue.
   (b) Eigenvector.
   (c) Eigenspace.
   (d) Difference Equation.
   (e) Characteristic equation.
   (f) Similarity Transformation.
   (g) Diagonalization
   (h) Matrix for a Linear transformation relative to a Basis $\mathcal{B}$ or $\mathcal{B}$ matrix for a Linear transformation.

2. **Key Concepts:**
   (a) Eigen space associated with an eigenvalue.
   (b) Theorem 2.
   (c) Diagonalising a matrix.
   (d) Eigen-basis for $\mathbb{R}^n$.
   (e) Geometric meaning of $\mathcal{B}$ matrix for a Linear transformation.
   (f) Difference Equation.

3. **Skills to Master:**
   (a) Computing the Characteristic polynomial of a matrix.
   (b) Computing Eigenvalues and Eigenvectors, Eigenspaces.
   (c) Solving difference equations.
   (d) Diagonalising a matrix A and computing A^k for any k.
   (e) Computing the $\mathcal{B}$ matrix for a Linear transformation.

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Quiz 8 (Questions)

1. Section 5.2: 25.
2. Consider the matrix $A = \begin{bmatrix} 2 & 2 & -1 \\ 2 & -2 & 2 \\ -1 & 2 & 1 \end{bmatrix}$.
   (a) Find the characteristic polynomial of A.
   (b) Diagonalise the matrix A..i.e. find matrices P and D such that $A = PDP^{-1}$. Find A^4
3. State whether the following are true or false. Please explain your answer.
   (a) Suppose A and B are similar. A is invertible means that B is also invertible.
   (b) Suppose A^2 is diagonalizable then it implies that A is diagonalizable.
4. Consider the Linear transformation represented by $A = \begin{bmatrix} 7 & -12 \\ 2 & -3 \end{bmatrix}$. Calculate the matrix of this transformation relative to the basis $\mathcal{B} = \{ \begin{bmatrix} 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix} \}$