

Mth 306 Test 1 | **Summer 2007** | **Name:**

Bent Petersen 306u2007-test1.tex

Date: (Date and time by arrangement.) Location: MLC. Time: 80 m in.

- Before doing anything else fill in your name in the space provided above.
- This test consists of multiple-choice problems and one or more work-out problems. Fill in the answers to the multiple-choice problems in the boxes provided. A scantron is not required. Depending on your solution methods your answers may appear in a different form from the ones provided on the test. You are expected to be able to provide the appropriate manipulations to identify the correct answer.
- For the work-out problem(s) you are expected to show some well-chosen work. Otherwise you will not receive full credit.
- You may use one 8.5 × 11 inch note sheet prepared in advance. You may write on both sides of your note sheet. Note sheets may not be shared. If you do not bring a note sheet you will have to do without any help notes. You may not use any books, notebooks, additional note sheets nor note cards.
- You may use a simple scientific calculator or a modest graphics calculator on this test and you are expected to have one available. An overly elaborate calculator, laptop, handheld or notebook computer, or any device capable of extensive symbolic manipulation (other than your own brain) will not be allowed. Calculators and other equipment may not be shared.
- During the test be sure to check the board occasionally for corrections. Note $\log(x)$ means the natural logarithm of x .
- There are 2 multiple-choice problems worth 6 points each, 9 multiple-choice problems worth 8 points each, and 1 work-out problem(s) worth 20 points each. The total number of points is 104 points. The number of problems is 12.

Multiple-choice problems: 2 problems, 6 points each.

Problem 1. If

$$\frac{3 - 2i}{1 + 2i} = a + bi$$

where a and b are real then $b =$

- A.)** -1 **B.)** $-\frac{1}{5}$
C.) $\frac{8}{5}$ **D.)** $\frac{3}{5}$ **E.)** None of the foregoing.

←Mark your answer here

(Problem 1).

Problem 8. Compute the determinant, $\det(A)$, of the matrix

$$A = \begin{bmatrix} u & 2 & 1 \\ u & 1 & 2 \\ 2 & 1 & 1 \end{bmatrix}.$$

- A.)** $2u - 2$ **B.)** $u^2 + 2$
C.) $6 - 2u$ **D.)** $6 + 2u$ **E.)** None of the foregoing.

←Mark your answer here

(Problem 8).

Problem 9. Let

$$A = \begin{bmatrix} u + 1 & 1 \\ 2 & 1 \end{bmatrix}$$

For what values of u is A invertible?

- A.)** no u **B.)** $u \neq 1$
C.) $u \neq -1$ **D.)** all u **E.)** None of the foregoing.

←Mark your answer here

(Problem 9).

Problem 10. Let

$$A = \begin{bmatrix} u & 2 & 3 \\ 1 & 1 & 2 \\ u - 1 & 1 & 1 \end{bmatrix}$$

Compute the determinant $\det(A)$.

- A.)** 0 **B.)** 1
C.) $4 - 4u$ **D.)** $4 + 4u$ **E.)** None of the foregoing.

←Mark your answer here

(Problem 10).

Problem 11. One of the eigenvectors of the matrix

$$A = \begin{bmatrix} -12 & 16 & 9 \\ -11 & 15 & 5 \\ -3 & 3 & 6 \end{bmatrix}$$

is $[37, 29, 6]^T$. Find the corresponding eigenvalue.

- A.)** 2 **B.)** 3
C.) 4 **D.)** 5 **E.)** None of the foregoing.

←Mark your answer here

(Problem 11).

Work-out problems: 1 problem(s), 20 points each.

Problem 12. Let

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 5 & 4 \\ -2 & 0 & 2 \end{bmatrix}$$

Find the eigenvalues and corresponding eigenvectors of A .

Use the backs of the test pages for scratch work.