

Exam #2 Information and Topics – Fall 2022

***Recall: All exams must be proctored**

Exam #2 must be taken on Thursday, October 20 or Friday, October 21. The exam will be completed on paper and you will only be allowed to use a writing utensil, a calculator, and scrap paper (no books, notes, internet, etc...).

You will be given up to 90 minutes to complete the exam.

The deadline for signing up for Exam #2 is the end of the day on Monday, October 17.

For those of you taking the exam at MCC, use Registerblast to sign up for a day and time to take the exam. Registerblast link → <https://www.registerblast.com/monroecc/Exam/List>

For those of you taking the exam with a personal proctor, you must send me an email (by the deadline above) indicating which day you have scheduled to take the exam with your proctor (I do not need to know the time). *I will not send an exam to your proctor if you do not sign up.

On the next page you will find a list of topics for Exam #2.

For each of the “procedural/computational” types of problems, I have identified a sample problem (in a couple of cases more than one) from the book to give you a rough idea of the kind of problem to expect. Looking at the specific problem that I have identified is not by itself intended to prepare you to solve the exam problem, so you are encouraged to look at similar problems in the book, notes, and/or videos.

Exam Topics

***Calculators ARE allowed on this exam and I assume that you will be using your calculator to expedite some of the required computations and row reductions. In any situation where you use the calculator, you must show sufficient work that includes what matrix/matrices you entered into the calculator along with the result.**

Definitions, Theorems, and Concepts:

You are responsible for knowing the definitions, theorems, and concepts presented in class. It would be a good idea to look through all of the theorems and definitions in Testing Unit 2 (Chapter 4 of the book) and pay close attention to those that are not obvious to you. You will be tested on these items in the following ways:

- True/False questions
- Concept questions which require very little work, but require you to understand the concepts to answer a question.

Computation/Solving/Procedural Problems:

Problems of this type will be selected from the following:

- Given a set of vectors S , determine whether or not a particular vector is in the span of S . If the vector is in the span of S , be able to express it as a linear combination of the vectors in S . [ex. 4.2 #10]
- Determine whether or not a collection of vectors is linearly independent or linearly dependent. Be able to support your answer. These vectors are likely to be chosen from \mathbb{R}^n , \mathbb{P}_n , and/or M_{mn} . [ex. 4.3 #4]
- Determine whether or not a given collection of vectors form a basis for a specified vector space. Be able to support your answer. These vectors are likely to be chosen from \mathbb{R}^n , \mathbb{P}_n , and/or M_{mn} . [ex. 4.4 #3, #7]
- Given a basis for a vector space, write the coordinate vector relative to the basis for a specified vector within the vector space. [ex. 4.4 #25b]
- Determine the dimensions of a given vector space and be able to find a basis for a given vector space. [ex. 4.5 #8, #11]
- Find the transition matrix from a basis \mathcal{B}' to a basis \mathcal{B} . Be able to use the transition matrix to obtain $[\mathbf{v}]_{\mathcal{B}}$ given $[\mathbf{v}]_{\mathcal{B}'}$. [ex. 4.6 #3]
- Obtain bases for the row space, column space, and nullspace of a matrix. [ex. 4.7 #10a, #11a]
- Determine the rank, and nullity of a matrix. [ex. 4.8 #1]
- Given the dimensions and rank of a matrix A , determine the dimensions of the row space of A , the col. space of A , the nullspace of A , and the nullspace of A^T . [ex. 4.8 #9]