

MAT 211: Intro Linear Algebra, L03, Spring 2023 Homework Assignment 6

WebAssign Problems due before 9am, Wednesday, 03/22

20% bonus for submissions **before 9am, Saturday, 03/18**

Written Assignment due before 4pm, Wednesday, 03/22 in Math 3-111

or handed in **before** the lecture on Wednesday, 03/22, in ESS 079

Please read Sections 3.5, 6.2, 6.3

(ignore all binary/modular arithmetic stuff).

Written Assignment: 6.2 15,40; Problem B below

Show your work; correct answers without explanation will receive no credit, unless noted otherwise

Please write your solutions legibly; the grader will disregard solutions that are not readily readable. All solutions must be stapled (no paper clips) and have your name (first name first) and HW number in the upper-right corner of the first page.

Problem B

Let \vec{u} and \vec{v} be nonzero, non-parallel (column) vectors in \mathbb{R}^2 . Let $\theta \in (0, \pi)$ be the angle between them.

(a) Draw a parallelogram determined by \vec{u} and \vec{v} and show that its area A is given by

$$A = \|\vec{u}\| \|\vec{v}\| \sin \theta.$$

(b) Show that

$$(\vec{u} \cdot \vec{v})^2 + (\det[\vec{u} \ \vec{v}])^2 = \|\vec{u}\|^2 \|\vec{v}\|^2.$$

(c) Show that $A = |\det[\vec{u} \ \vec{v}]|$.

(d) What determines whether $\det[\vec{u} \ \vec{v}]$ is positive or negative?

NO late homework will be accepted

Once the instructor starts the lecture in which a homework assignment is due, he will no longer accept this assignment. Late homework will **not** be accepted under *any* circumstances; you will not receive a response to any email asking for an extension. If there is *any* chance of you arriving late to the class at which a homework is due or if you will be out of town when it is due, you can turn it in (give to the instructor or slip under the instructor's office door) any time before it is due (which you are always welcome to do). If something completely unexpected comes up, then you'll benefit from the *lowest homework score dropped* policy.