

MATH 221 L07

Fall, 2007

**FINAL REVIEW PROBLEMS**

Problems from the text.

**Exercises 1.2:** #3, 5, 7, 8, 11.

**Exercises 1.3:** #2.

**Exercises 2.1:** #6, 15, 17, 18.

**Exercises 2.2:** #8, 10, 12, 16, 18, 25, 26.

**Exercises 2.3:** #2, 3, 4, 5, 6, 10, 21, 31.

**Exercises 2.4:** #2, 6.

**Exercises 3.1:** #1, 11.

**Exercises 3.2:** #1, 3, 5, 8, 10.

**Exercises 3.3:** #1, 6, 8.

**Exercises A (appendix)** # 1 - 3, 5, 18 - 20, 23.

**Exercises 4.1.** # 1 - 7, 22 - 24.

**Exercises 4.2.** # 1 - 5, 10, 11, 14 - 16, 20.

**Exercises 4.3.** # 2, 4, 5.

**Exercises 4.4.** # 1 - 3.

**Exercises 2.5.** # 1, 3. For a linear transformation  $T = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ , specify conditions so that  $T$  preserves area,  $T$  preserves orientation,  $T$  preserves dot product,  $T$  leaves a vector invariant.

Hint. You should know the following: A linear transformation  $T$  in  $\mathbb{R}^2$  preserves

- area if  $\det T = \pm 1$ ,
- orientation if  $\det T > 0$ ,
- dot product if  $T^T T = I$ .
- Moreover,  $T$  leaves a vector invariant if it has eigenvalue 1.