LINEAR ALGEBRA HOMEWORK
2020 SPRING

Homework

Textbook: Steven J. Leon. *Linear Algebra with Applications.* **9**th Edition. China Machine Press.

Homework 1.
Content: 1.1 Systems of Linear Equations; 1.2 Row Echelon Form.
Due: January 9, 2020(Thursday, Week 19, 2019 Fall)
Exercises 1.1: 1(b), 2, 3(b)(d), 4, 5(d), 6(h), *7, *8, 9;
Exercises 1.2: 1, 2(a)(c)(d), 4, 5(g)(i)(k), 7, 8, 14, 15, *22(b).

Homework 2.
Content: 1.3 Matrix Arithmetic.
Due: January 16, 2020(Thursday, Week 20, 2019 Fall)
Exercises 1.3: 1, 2, 4, 9, 11.

Homework 3.
Content: 1.4 Matrix Algebra; 1.5 Elementary Matrices.
Exercises 1.4: 1, 3, 8, 10, 17, 20;
Exercises 1.5: 3, 7, 8(c), 10(e)(f), 13, 31.

Homework 4.
Content: 2.1 The Determinant of A Matrix; 2.2 Properties of Determinants.
Exercises 2.1: 3(g)(h), 4(c)(d), 11, 13;
Exercises 2.2: 1(b), 2(b), 3(a)(f), 7(c)(d), 9(d)(f), 11, 12, 14, 18.

Homework 5.
Content: 2.3 Additional Topics and Applications; 3.1 Definition and Examples (of Vector Spaces).
Exercises 2.3: 1(c), 3, 6, 9, 14;
Exercises 3.1: 6, 7, 12, 13, 14.

Homework 6.
Content: 3.2 Subspaces; 3.3 Linear Independence.
Exercises 3.2: 2, 4(d), 5, 8, *10, 12(b)(d)(e), 13, 18, *19, *26;
Exercises 3.3: 2(c) (d), 4(c), 10, 12, 13, *16, *20.

Homework 7.

Content: 3.4 Basis and Dimension; 3.6 Row Space and Column Space;

Exercises 3.4: 2, 4, 7, 8, 10, 11, 17, 18;

Exercises 3.6: 1(c), 3, 4(d)(e), 14, 15, 16, 19.

Homework 8.

Content: 4.1 Definition and Examples (of Linear Transformations); 4.2 Matrix Representations of Linear Transformations.

Due: March 20, 2020

Exercises 4.1: 3, 4, 5, 8, 10, 17, 19, 23;

Exercises 4.2: 2, 4, 8.

Homework 9.

Content: 3.5 Change of Basis; 4.3 Similarity.

Due: March 27, 2020

Exercises 3.5: 3, 10;

Exercises 4.3: 2, 5, 6, 8, 15.

Homework 10.

Content: 5.1 The Scalar Product in $\mathbb{R}^n$; 5.2 Orthogonal Subspaces.

Due: April 3, 2020

Exercises 5.1: 1, 3, 4, 6, 20;

Exercises 5.2: 2, 3, 4, 6, 7, 9, 17.

Homework 11.

Content: 5.3 Least Squares Problems; 5.4 Inner Product Spaces; 5.5 Orthonormal Sets; 5.6 The Gram-Schmidt Orthogonalization process.

Exercises 5.3: 1(c), 5, 6, *8, *12;

Exercises 5.4: 2, 4, *13 *14, 16, *31;

Exercises 5.5: 2, 5, 7, 8, 12, *20, *26, 30;

Exercises 5.6: 3, 5, 6, 7, *12, *13;

Homework 12.

Content: 6.1 Eigenvalues and Eigenvectors; 6.3 Diagonalization; 6.4 Hermitian Matrices.

Exercises 6.1: 1(i)(k) (l), 4, 5, 7, *8, *10, 14;

Exercises 6.3: 1(d)(e), 3(1(d),(e) only), *10, 32(c);

Exercises 6.4: 1, 4, 5(c)(d), 10, 14.