Section 4.5:

Exercise 4.5.19:

(1) The number of pivot columns of a matrix equals the dimension of it's column space.
Answer: True. By Theorem 6 which says that the pivot columns of a matrix A for a basis for the $Col(A)$. Therefore it must be true that the number of pivot columns is equal to the number of pivots.

(2) A plane in $\mathbb{R}^3$ is a two-dimensional subspace pf $\mathbb{R}^3$.
Answer: False. Consider a plane that does not go through the origin, It cannot be a subspace.

(3) The dimension of vector space $_4$ is 4.
Answer: False. $_4$ is all fourth degree polynomials, which have 5 coefficients. Therefore the dimension of $_4$ is 5.

(4) If the $DimV = n$ and S is linearly independent set in V , then S is a basis for V.
Answer: False. It is possible that the set S does not span V therefore it is not always a basis. Consider any $V = \mathbb{R}^2$ and $S = [1, 1]$, S is a linearly independent set that contains one vector, but It doesn't span $\mathbb{R}^2$ therefore it is not a basis.

(5) If a set $\{v_1, ...v_p\}$ spans a finite-dimensional vector space V and if T is a set of more than p vectors in V, then T is linearly dependent.
Answer: True. By spanning set theorem.

Exercise 4.5.22: The first four Laguerre polynomials are $1, 1-t, 2-4t+t^2$, and $6-18t+9t^2-t^3$
Solution:

Exercise 4.5.24: **Solution:**

Section 4.6:

Exercise 4.6.17: **Solution:**

Exercise 4.6.20: **Solution:**

Exercise 4.6.28: **Solution:**

Section 4.7:

Exercise 4.7.7: **Solution:**

Exercise 4.7.9: **Solution:**

Exercise 4.7.14: Solution:

Exercise 4.7.16: Solution: