

TRENTO, A.A. 2019/20
MATHEMATICS FOR DATA SCIENCE/BIOSTATISTICS
EXERCISE SHEET # 4

Important! In solving the exercises

- explain what you are doing,
- explain why you are doing what you are doing, and
- spell out all intermediate steps.

Exercise 4.1. Write a Cartesian (implicit) equation of the plane given by the parametric equations

$$\begin{cases} x = 1 + s + t \\ y = 2 + s \\ z = 3 + s + 2t \end{cases}$$

Exercise 4.2. Write parametric equations of the plane whose Cartesian equation is

$$2x - y + 3z = 5$$

Exercise 4.3. Write parametric equations of the line whose Cartesian equations are

$$\begin{cases} x + y - z = 3 \\ 2x + y = 4 \end{cases}$$

Exercise 4.4. Write Cartesian equations of the line whose parametric equations are

$$\begin{cases} x = 3 + 2t \\ y = 4 - t \\ z = 5 + t \end{cases}$$

Exercise 4.5. Say if the set $S = \{(1, 2, 3) + t(1, 2, 1) : t \in \mathbf{R}\}$ is a vector subspace of \mathbf{R}^3 .

Exercise 4.6. Say if the set $S = \{(1, 2, 3) + t(2, 4, 6) : t \in \mathbf{R}\}$ is a vector subspace of \mathbf{R}^3 .

Exercise 4.7. Say if the set $S = \{t(2, 4, 6) + u(2, 3, 0) : t, u \in \mathbf{R}\}$ is a vector subspace of \mathbf{R}^3 .

Exercise 4.8. Say if the set of the solutions of the equation $x + 2y + 3z = 4$ is a vector subspace of \mathbf{R}^3 .

Exercise 4.9. Let S be the vector space of all the real 2×2 matrices.

Say if the subset T of S of all the matrices in the form

$$\begin{bmatrix} a & 0 \\ 0 & 1 \end{bmatrix} \quad \text{with } a \in \mathbf{R}$$

is a vector subspace of S .

Exercise 4.10. Let S be the vector space of all the real 2×2 matrices.

Say if the subset T of S of all the matrices in the form

$$\begin{bmatrix} a & b \\ b & a \end{bmatrix} \quad \text{with } a, b \in \mathbf{R}$$

is a vector subspace of S .