

MATH133 – Summer 2023 – Tutorial 1

Please attempt the following exercises before the next tutorial. I encourage you to try all of them, but no worries if you get stuck!

1.
 - (a) Prove that the neutral real number with respect to addition is unique.
 - (b) Prove that the neutral real number with respect to multiplication is also unique.
2. We say a system is *consistent* if it has a solution (or more), and *inconsistent* otherwise. Draw on the xy -plane examples of systems of linear equations for each of the following scenarios:
 - (a) A consistent system of two equations for two unknowns x and y .
 - (b) An inconsistent system of two equations for two unknowns x and y .
 - (c) An inconsistent system of three equations for two unknowns x and y .
 - (d) A consistent system of three equations for two unknowns x and y .
3. Solve the following systems of equations:

(a)
$$\begin{cases} x + y = 0 \\ x - y = 0 \end{cases}$$

(b)
$$\begin{cases} x + y = 0 \\ 2x + 2y = 0 \end{cases}$$

(c)
$$\begin{cases} x + y = 0 \\ 2x + 2y = 1 \end{cases}$$

(d)
$$\begin{cases} x + 2y + 3z = 0 \\ 2x + 4y + z = 0 \\ 2x + 2y + 2z = 0 \end{cases}$$

(e)
$$\begin{cases} x + y + z = 2 \\ 2x + 4y + z = 0 \\ 2x + 3y + 2z = 1 \end{cases}$$

4. For (a), (b), (c) above, draw the system of equations.