

Math 1553 Worksheet: Fundamentals and §2.1

1. For each equation, determine whether the equation is linear or non-linear. Circle your answer. If the equation is non-linear, briefly justify why it is non-linear.

a) $3x_1 + \sqrt{x_2} = 4$ Linear Not linear

b) $x_1 = x_2 - x_3 + 10x_4$ Linear Not linear

c) $e^\pi x + \ln(13)y = \sqrt{2} - z$ Linear Not linear

2. Consider the following three planes, where we use (x, y, z) to denote points in $\mathbf{R}^3$:

$$2x + 4y + 4z = 1$$

$$2x + 5y + 2z = -1$$

$$y + 3z = 8$$

Do all three of the planes intersect? If so, do they intersect at a single point, a line, or a plane?

3. Find all values of h so that the lines $x + hy = -5$ and $2x - 8y = 6$ do *not* intersect. For all such h , draw the lines $x + hy = -5$ and $2x - 8y = 6$ to verify that they do not intersect.