MATH 104: WORKSHEET 1

1. Concepts

(1) Lines & planes in 2D & 3D
(2) Curves & surfaces in 2D & 3D
(3) Implicit and parametric representations

2. Discussions

Question 1. What happens if you take the equation of a line in 2D, say $2x - 3y = 7$ and interpret it in 3D?

Question 2. (1) What does each of

$$3x + y - z = 4$$

and

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

represent?
(2) If taking both of the above equation together, what do they represent? Is there another way to represent this object?

Question 3. Where does the line

$$x(t) = 2t - 1\,; y(t) = 3t + 2\,; z(t) = 4t$$

intersect the plane given by $4x + 3y - z = 3$?
What happens if it's not a plane but a more general surface?

Question 4. (1) Given two lines in 2D, what is there intersection?
(2) What could it be?
(3) What about intersection two lines in 3D?
(4) What about intersection of a line and a plane in 3D?
(5) What about intersection of two planes in 3D?

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