

Please PRINT your name \_\_\_\_\_

**No calculators, cell phones, computers, notes, etc.**

Circle your answer. Make your work **correct**, **complete** and **coherent**.

The quiz is worth 5 points. The solutions will be posted on my website later today.

### Quiz 5, September 16, 2019

Find parametric equations for the line which is the intersection of the planes  $x + y + z = 1$  and  $x + y = 2$ .

**ANSWER:** Let  $\ell$  be the line which is the intersection of the planes  $x + y + z = 1$  and  $x + y = 2$ . We find two points on  $\ell$

When  $x = 0$ , we solve  $y + z = 1$  and  $y = 2$  simultaneously and get the point  $P_0 = (0, 2, -1)$  which is on  $\ell$ .

When  $y = 0$ , we solve  $x + z = 1$  and  $x = 2$  simultaneously and get the point  $P_1 = (2, 0, -1)$  which is on  $\ell$ .

The line  $\ell$  contains the point  $P_0 = (0, 2, -1)$  and is parallel to the vector  $\vec{v} = \overrightarrow{P_0P_1} = 2\vec{i} - 2\vec{j}$ . The line  $\ell$  is

$$x - 0 = 2t, \quad y - 2 = -2t, \quad z + 1 = 0.$$

In other words,  $\ell$  is

$$\boxed{x = 2t, \quad y = 2 - 2t, \quad z = -1.}$$

Check We verify that our answer satisfies the equation  $x + y + z = 1$ :

$$2t + (2 - 2t) - 1 = 1. \checkmark$$

We verify that our answer satisfies the equation

$$x + y = 2$$

:

$$2t + (2 - 2t) = 2. \checkmark$$