Question

Find the intersection points, if any, for each system of equations

$$\begin{cases} x^2 + y^2 = 1 \\ y = x + 1 \end{cases}$$

Solution

Substitute for $y = x + 1$ into the first equation of the system $x^2 + y^2 = 1$:

$x^2 + (x+1)^2 = 1;$

$x^2 + x^2 + 2x + 1 = 1;$

$2x^2 + 2x = 0;$

$x^2 + x = 0;$

$x(x+1) = 0;$

$x = 0$ or $x = -1$

Next,

if $x = 0$ then $y = x + 1 = 0 + 1 = 1;$

if $x = -1$ then $y = x + 1 = -1 + 1 = 0.$

Thus, M(0,1), N(-1,0) are intersection points.

Answer: M(0,1), N(-1,0).