(1 point) **CUNY/CityTech/CollegeAlgebra_Trig/NonLinearSystems/circle-ellipse.pg**

Solve the following system of equations.

$x^2 + y^2 = 18$

$5x^2 + y^2 = 54$

Solution(s):

- Enter your answers as points: (x, y)
- Because these systems are non-linear, you may have more than one solution.
- If you have more than one solution, enter your answers as a list of points: $(x_0, y_0), (x_1, y_1)$
- Use 'sqrt(...)' to enter radical answers, do not use decimal approximations.

Hint:

Solution:

Ⓐ Ⓑ Elimination Method

1. Choose to eliminate y.

$$-\text{Ⓐ}\quad -x^2 - y^2 = -18$$
$$\text{Ⓑ}\quad 5x^2 + y^2 = 54$$
$$4x^2 = 36$$
$$x^2 = 9$$
$$x = \pm 3$$

2. Solve for y.

$$x^2 + y^2 = 18$$

Let $x = 3$.

$$(3)^2 + y^2 = 18$$
$$9 + y^2 = 18$$
$$y^2 = 9$$
$$y = \pm 3$$

→ $(3, -3), (3, 3)$ are solutions

Let $x = -3$

$(-3)^2 + y^2 = 18$

$9 + y^2 = 18$

$y^2 = 9$

$y = \pm 3$

$\rightarrow (-3,-3), (-3,3)$ are solutions

$\therefore$ Solution!

$(x,y) \in \{(-3,-3), (-3,3), (3,-3), (3,3)\}$

By substitution Method.

$y^2 = 18 - x^2$

$5x^2 + y^2 = 54$

$5x^2 + (18 - x^2) = 54$

$4x^2 + 18 = 54$

$4x^2 = 36$

$x^2 = 9$

$x = \pm 3$

Solving for y is still the same method.