

$$\begin{bmatrix} 1 & 3 & -1 & 4 \\ -3 & -8 & 1 & -16 \\ 4 & 14 & -7 & 11 \end{bmatrix}$$

Solve the system of linear equations:

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

$$-3x - 8y + z = -16$$

$$4x + 14y - 7z = 11$$

Obviously,  $x=1, y=2, z=3$ .

$$3R1 \quad 3x + 9y - 3z = 12$$

$$R2 \quad -3x - 8y + z = -16$$

$$3R1 + R2 \quad y - 2z = -4$$

New System:

$$-4R1 \quad -4x - 12y + 4z = -16$$

$$R3 \quad 4x + 14y - 7z = 11$$

$$-4R1 + R3 \quad 2y - 3z = -5$$

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

$$y - 2z = -4$$

$$2y - 3z = -5$$

$$-2R2 \quad -2y + 4z = 8$$

$$R3 \quad 2y - 3z = -5$$

$$z = 3$$

$$y - 2z = -4$$

$$y - 2(3) = -4$$

$$y - 6 = -4$$

$$y = 2$$

$$(x, y, z) = (1, 2, 3)$$

3<sup>rd</sup> System:

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

$$y - 2z = -4$$

$$z = 3$$

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

$$x + 3(2) - 3 = 4$$

$$x + 6 - 3 = 4$$

$$x + 3 = 4$$

$$x = 1$$

SS.3 # 25 Solve the system

$$2x^2 - y^2 = 1$$

$$2x^2 - 4y^2 = -2$$

$$\begin{array}{r} -R1 \\ R2 \end{array} \quad \begin{array}{l} -2x^2 + y^2 = -1 \\ 2x^2 - 4y^2 = -2 \end{array}$$

$$\hline -R1 + R2 \quad -3y^2 = -3$$

$$\Rightarrow y^2 = 1$$

$\Rightarrow y = \pm 1$ . Now find  $x$ 's to go with:

$$2x^2 - y^2 = 1$$

$$y = 1: \quad 2x^2 - (1)^2 = 1$$

$$2x^2 = 2$$

$$x^2 = 1$$

$x = \pm 1 \Rightarrow (1, 1), (-1, 1)$  to go with  $y = 1$

$$y = -1: \quad 2x^2 - (-1)^2 = 1$$

$2x^2 - 1 = 1$  is same as  $y = 1$  sitch.

$$\text{So } x = \pm 1 \Rightarrow (1, -1), (-1, -1)$$

$$(x, y) \in \{ (1, 1), (-1, 1), (1, -1), (-1, -1) \}$$

