4) a) Solution: $x = 2.4 \quad y = -0.8$

Possible steps:

Multiply Eq1 by 28, Eq2 by $(x+y)$:

$$\begin{cases} 7(x-y)-12(y-2)=56 \\ x-y=2(x+y) \end{cases}$$

Remove the brackets, simplify:

$$\left\{\begin{array}{l} 7x-19y=32 \\ -x-\ \ 3y=0 \end{array}\right. \left|\begin{array}{l} \quad + \\ \cdot 7\ + \end{array}\right. \rightarrow \ -40y=32 \ \rightarrow \ y=-0.8$$

x by inserting: $-x-3y=0 \ \rightarrow \ -x-3\cdot(-0.8)=0 \ \rightarrow \ x=2.4$

b) Lösung: The system hat infinitely many solutions.
(All the pairs (x,y) that satisfy $-3x+y=2$ are solutions.)

Remarks:

After eliminating the brackets and simplifying you get two identical equations (or at least multiples of each other):

$$\begin{cases} -3x+y=2 \\ -3x+y=2 \end{cases}$$

Hence the solution set of the system equals the solution set of this (doubled) equation.

c) Two solutions: $x_1 = 1.5 \quad y_1 = 0.25$
$x_2 = -1 \quad y_2 = -1$

Possible steps:

Solve Eq2 for y: $y = x^2 - 2 \quad (*)$

Inserting it into Eq1 leads to

$$\frac{x-1}{x^2-2} = 2 \qquad |\cdot(x^2-2)$$

Multiply by the denominator term, rearrange, simplify; you get the quadratic equation

$$2x^2 - x - 3 = 0$$

with the above solutions for x.

y-values by inserting into (*).