Answer on Question #38317 - Math - Functional Analysis

$$\begin{cases} y + 4x = 27 \\ xy + x = 40 \end{cases}$$

Let's express y from the first equation and substitute into the second equation:

$$y = 27 - 4x$$

$$x(27 - 4x) + x = 40$$

$$-4x^2 + 28x - 40 = 0$$

Dividing this equation by -4:

$$x^2 - 7x + 10 = 0$$

Roots of this quadratic equation:

$$x_1 = 2; x_2 = 5$$

Substituting roots back into expression for y:

$$y_1 = 27 - 4x_1 = 27 - 4 \cdot 2 = 19$$

$$y_2 = 27 - 4x_2 = 27 - 4 \cdot 5 = 7$$

Thus solutions of the system are $(2,19); (5,7)$.