24.01.2024 (среда)

467. Решите систему уравнений:

1) $\begin{cases} x + y - xy = 1, \\ x + y + xy = 9; \end{cases}$

2) $\begin{cases} 3xy + 2x = -4, \\ 3xy + y = -8; \end{cases}$

3) $\begin{cases} xy - x = 24, \\ xy - y = 25; \end{cases}$

4) $\begin{cases} 2x^2 + y^2 = 66, \\ 2x^2 - y^2 = 34. \end{cases}$

1) $\begin{cases} x+y-xy=1 \\ x+y+xy=9 \end{cases}$

① $2x+2y=10$

$2(x+y)=10$

$x+y=\frac{10}{2}$

$x+y=5$

② $x+y+xy=9$

$5+xy=9$

$xy=4$

$x=\frac{4}{y}$

③ $x+y=5$

$x=\frac{4}{y}$

$\frac{4}{y}+y=5 \quad | \cdot y$

$\frac{4+y^2}{y}=\frac{5}{1}$

ОДЗ $y \neq 0$

$4+y^2=5y$

$y^2-5y+4=0$

$D=25-4\cdot1\cdot4=9$

$y_1=\frac{5+3}{2}=\frac{8}{2}=4$

$y_2=\frac{5-3}{2}=\frac{2}{2}=1$

④ $x_1=\frac{4}{4}=1$

$x_2=\frac{4}{1}=4$

2) $\begin{cases} 3xy + 2x = -4 \\ 3xy + y = -8 \end{cases}$

① $\cancel{3xy} + 2x - \cancel{3xy} - y = -4 + 8$

$2x - y = 4$

$2x - 4 = y$

$y = 2x - 4$

② $3xy + y = -8$

$3x \cdot (2x - 4) + 1(2x - 4) = -8$

$6x^2 - 12x + 2x - 4 = -8$

$6x^2 - 10x = -4$

$6x^2 - 10x + 4 = 0$

$D = 100 - 4 \cdot 6 \cdot 4 = 100 - 96 = 4$

$x_1 = \frac{10+2}{12} = 1$

$x_2 = \frac{10-2}{12} = \frac{8^2}{\cancel{12}_3} = \frac{2}{3}$

③ $y_1 = 2 - 4$; $y_2 = \frac{4}{3} - 4$;

$y_1 = -2$; $y_2 = \frac{4 - 12}{3}$

$y_2 = -\frac{8}{3}$

3) $\begin{cases} xy - x = 27 \\ xy - y = 25 \end{cases}$

① $xy - x - (xy - y) = -1$

$-x + y = -1$

$-x = -1 - y \mid \cdot(-1)$

$x = 1 + y$

② $xy - y = 25$

$(1 + y) \cdot y - y = 25$

$y + y^2 - y = 25$

$y^2 = 25$

$y = \pm 5$

③ $x = 1 + 5$; $x = 1 - 5$

$x = 6$; $x = -4$.

4) $\begin{cases} 2x^2 + y^2 = 66 \\ 2x^2 - y^2 = 34 \end{cases}$

① $2x^2 + y^2 - (2x^2 - y^2) = 32$

$2x^2 + y^2 - 2x^2 + y^2 = 32$

$2y^2 = 32$

$y^2 = 16$

$y = \pm 4$

② $2x^2 + 16 = 66$

$2x^2 = 50$

$x^2 = 25$

$x = \pm 5$

469. Решите систему уравнений:

1) $\begin{cases} x^2 + 10xy + 25y^2 = 49, \\ x - 5y = -3; \end{cases}$

2) $\begin{cases} x^2 + 4xy + 4y^2 = 4x + 2y, \\ x + 2y = 4; \end{cases}$

$x^2 + 10xy + 25y^2 = (x + 5y)^2$

1) $\begin{cases} x^2 + 10xy + 25y^2 = 49 \\ x - 5y = -3 \end{cases}$

① $x - 5y = -3 \mid ^2$

$(x - 5y)^2 = 9$

② $-\begin{cases} x^2 + 10xy + 25y^2 = 49 \\ x^2 - 10xy + 25y^2 = 9 \end{cases}$

$x^2 + 10xy + 25y^2 - x^2 + 10xy - 25y^2 = 40$

$20xy = 40$

$xy = 2$

$x = \frac{2}{y}$ .....