



Simultaneous Equations Non Linear SOLUTIONS



1. $x = 1, y = 2$ $x = 2, y = 1$
2. $x = 2, y = 3$ $x = 3, y = 2$
3. $x = 3, y = 4$ $x = 4, y = 3$
4. $x = -1, y = 3$ $x = 3, y = -1$
5. $x = -2, y = 5$ $x = 5, y = -2$
6. $x = 2, y = 4$ $x = 5, y = 1$ (S*)
7. $x = -3, y = 2$ $x = 5, y = -6$
8. $x = 3, y = -5$ $x = 5, y = -3$
9. $x = 4, y = -1$ $x = 3, y = -2$
10. $x = 1, y = -2$ $x = \frac{29}{13}, y = \frac{-2}{13}$ (S*)
11. $x = 2, y = -3$ $x = \frac{-46}{13}, y = \frac{9}{13}$
12. $x = -2, y = 4$ $x = \frac{-150}{29}, y = \frac{-114}{29}$ (S*)
13. $x = 3, y = -6$ $x = \frac{-48}{29}, y = \frac{327}{58}$





Question 6

$$\begin{aligned}
 x + y &= 6 \\
 x^2 + y^2 + 2x + 4y - 40 &= 0 \\
 x &= 6 - y \\
 (6 - y)^2 + y^2 + 2(6 - y) + 4y - 40 &= 0 \\
 36 - 12y + y^2 + y^2 + 12 - 2y + 4y - 40 &= 0 \\
 2y^2 - 10y + 8 &= 0 \quad (\div 2) \\
 y^2 - 5y + 4 &= 0 \\
 (y - 4)(y - 1) &= 0 \\
 y = 4 \quad y = 1 \\
 x = 6 - y \\
 x = 2 \quad x = 5
 \end{aligned}$$

Question 10

$$\begin{aligned}
 3x - 2y &= 7 \\
 x^2 + y^2 &= 5 \\
 3x &= 7 + 2y \\
 x &= \frac{7 + 2y}{3} \\
 \left(\frac{7 + 2y}{3}\right)^2 + y^2 &= 5 \\
 \frac{49 + 28y + 4y^2}{9} + y^2 &= 5 \quad (\times 9) \\
 49 + 28y + 4y^2 + 9y^2 &= 45 \\
 13y^2 + 28y + 4 &= 0 \\
 (13y + 2)(y + 2) &= 0 \\
 y = -\frac{2}{13} \quad y = -2 \\
 x &= \frac{7 + 2y}{3} \\
 x = \frac{7 + 2(-\frac{2}{13})}{3} \quad x = \frac{7 + 2(-2)}{3} \\
 x = \frac{29}{13} \quad x = 1
 \end{aligned}$$





Question 12

$$5x - 2y + 18 = 0$$

$$x^2 + y^2 + 2x + 2y - 24 = 0$$

$$5x = 2y - 18$$

$$x = \frac{2y - 18}{5}$$

$$\left(\frac{2y - 18}{5}\right)^2 + y^2 + 2\left(\frac{2y - 18}{5}\right) + 2y - 24 = 0$$

$$\frac{4y^2 - 72y + 324}{25} + y^2 + \frac{4y - 36}{5} + 2y - 24 = 0 \quad (\times 25)$$

$$4y^2 - 72y + 324 + 25y^2 + 20y - 180 + 50y - 600 = 0$$

$$29y^2 - 2y - 456 = 0$$

$$(29y + 114)(y - 4) = 0$$

$$y = -\frac{114}{29} \quad y = 4$$

$$x = \frac{2y - 18}{5}$$

$$x = \frac{2(-\frac{114}{29}) - 18}{5} \quad x = \frac{2(4) - 18}{5}$$

$$x = -\frac{150}{29} \quad x = -2$$

