Simultaneous Equations Non Linear
SOLUTIONS

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

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

$$5x - 2y + 18 = 0$$
$$x^2 + y^2 + 2x + 2y - 24 = 0$$
$$5x = 2y - 18$$
$$x = \frac{2y - 18}{5}$$
$$\left(\frac{2y - 18}{5}\right)^2 + y^2 + 2\left(\frac{2y - 18}{5}\right) + 2y - 24 = 0$$
$$\frac{4y^2 - 72y + 324}{25} + y^2 + \frac{4y - 36}{5} + 2y - 24 = 0 \quad (\times 25)$$
$$4y^2 - 72y + 324 + 25y^2 + 20y - 180 + 50y - 600 = 0$$
$$29y^2 - 2y - 456 = 0$$
$$(29y + 114)(y - 4) = 0$$
$$y = -\frac{114}{29} \quad y = 4$$
$$x = \frac{2y - 18}{5}$$
$$x = \frac{2(-\frac{114}{29}) - 18}{5} \quad x = \frac{2(4) - 18}{5}$$
$$x = -\frac{150}{29} \quad x = -2$$