1. Solve by completing the square: \( x^2 + 8x + 7 = 0 \)

2. Solve by completing the square: \( x^2 - 4x - 10 = 0 \)

3. Solve by completing the square: \( 2x^2 + 24x + 122 = 0 \)
1. Solve by completing the square: \( x^2 + 8x + 7 = 0 \)

\[
x^2 + 8x + 7 = 0 \quad \text{Subtract 7 from both sides.}
\]

\[
x^2 + 8x = -7 \quad \text{Square half the coefficient of the x-term } 4^2 = 16 \text{ and add that to both sides of the equation.}
\]

\[
x^2 + 8x + 16 = -7 + 16
\]

\[
x^2 + 8x + 16 = 9 \quad \text{Factor the left-hand side.}
\]

\[
(x + 4)^2 = 9 \quad \text{Next, take the square root of both sides (Square Root Property).}
\]

\[
x + 4 = \pm \sqrt{9}
\]

\[
x + 4 = \pm 3 \quad \text{Subtract 4 from both sides.}
\]

\[
x = -4 \pm 3
\]

So, \( x = -1 \) or \( x = -7 \) ← Answers (both answers check in the original equation)

2. Solve by completing the square: \( x^2 - 4x - 10 = 0 \)

\[
x^2 - 4x - 10 = 0 \quad \text{Add 10 to both sides.}
\]

\[
x^2 - 4x = 10 \quad \text{Square half the coefficient of the x-term } (-2)^2 = 4 \text{ and add that to both sides of the equation.}
\]

\[
x^2 - 4x + 4 = 10 + 4
\]

\[
x^2 - 4x + 4 = 14 \quad \text{Factor the left-hand side.}
\]

\[
(x - 2)^2 = 14 \quad \text{Next, take the square root of both sides (Square Root Property).}
\]

\[
x - 2 = \pm \sqrt{14}
\]

\[
x = 2 \pm \sqrt{14} \quad \leftarrow \text{Answers (both answers check in the original equation)}
\]

3. Solve by completing the square: \( 2x^2 + 24x + 122 = 0 \)

\[
2x^2 + 24x + 122 = 0 \quad \text{Divide both sides by 2.}
\]

\[
x^2 + 12x + 61 = 0 \quad \text{Subtract 61 from both sides.}
\]

\[
x^2 + 12x = -61 \quad \text{Square half the coefficient of the x-term } 6^2 = 36 \text{ and add that to both sides of the equation.}
\]

\[
x^2 + 12x + 36 = -61 + 36
\]

\[
x^2 + 12x + 36 = -25 \quad \text{Factor the left-hand side.}
\]

\[
(x + 6)^2 = -25 \quad \text{Next, take the square root of both sides (Square Root Property).}
\]

\[
x + 6 = \pm \sqrt{-25}
\]

\[
x + 6 = \pm 5i \quad \text{Subtract 6 from both sides.}
\]

\[
x = -6 \pm 5i \quad \leftarrow \text{Answers (both answers check in the original equation)}
\]