Answer key

The method: Vertex form

Complete the square to write $y = a(x - h)^2 + k$. The vertex is (h, k).

$y = x^2 + 2x - 6 \quad \rightarrow \quad y = (x + 1)^2 - 7$

$y = (x^2 + 2x + 1) - 7$ add $(2 \div 2)^2 = 1$ inside and subtract it outside

$y = (x + 1)^2 - 7$ write the square; the vertex is $(-1, -7)$

$y = -x^2 + 6x - 20 \quad \rightarrow \quad y = -(x - 3)^2 - 11$

$y = -(x^2 - 6x) - 20$ take -1 out of the x terms

$y = -(x^2 - 6x + 9) - 11$ add $(-6 \div 2)^2 = 9$ inside and subtract -1×9 outside

$y = -(x - 3)^2 - 11$ write the square; the vertex is $(3, -11)$

Problems 1 and 2 worked out · Version 0A

$y = -x^2 - 2x + 10 \quad \rightarrow \quad y = -(x + 1)^2 + 11$

$y = -(x^2 + 2x) + 10$ take -1 out of the x terms

$y = -(x^2 + 2x + 1) + 11$ add $(2 \div 2)^2 = 1$ inside and subtract -1×1 outside

$y = -(x + 1)^2 + 11$ write the square; the vertex is $(-1, 11)$

$y = x^2 + 8x + 13 \quad \rightarrow \quad y = (x + 4)^2 - 3$

$y = (x^2 + 8x + 16) - 3$ add $(8 \div 2)^2 = 16$ inside and subtract it outside

$y = (x + 4)^2 - 3$ write the square; the vertex is $(-4, -3)$

Vertex form · Version 0A

1) $y = -(x + 1)^2 + 11$ 2) $y = (x + 4)^2 - 3$
3) $y = (x + 5)^2 + 10$ 4) $y = (x + 7)^2 + 6$
5) $y = -(x - 5)^2 - 10$ 6) $y = -2(x + 3)^2 + 9$
7) $y = (x - 7)^2 + 6$ 8) $y = -2(x + 3)^2 - 6$
9) $y = 2(x + 6)^2 - 9$ 10) $y = 2(x + 3)^2 + 4$
11) $y = (x + 3)^2 - 11$ 12) $y = (x - 1)^2 + 9$
13) $y = (x - 1)^2$ 14) $y = (x + 6)^2 + 1$