

Completing the Square

Standard
↓
vertex

$$y = 4x^2 + 24x + 18$$

$\underbrace{\quad}_a \quad \underbrace{\quad}_h \quad \underbrace{\quad}_c$

$$y = 4(x^2 + 6x) + 18$$

$$y = 4(x^2 + 6x + 9) + 18 - 36$$

$$y = 4(x + 3)^2 - 18$$

$\underbrace{\quad}_a \quad \underbrace{\quad}_h \quad \underbrace{\quad}_k$

(3, -18)