Recall. Difference of squares theorem. \( x^2 + kx = (x + \frac{k}{2})^2 - (\frac{k}{2})^2 \)

3a. \( y = 2(x + 4)^2 - 3 \). Rewrite in the perfect square form \( a(x - x_0)^2 + y_0 \). Hint, \( x_0, y_0 \) can be negative. Then find the vertex.

3b. \( y = 2x^2 + 8x + 3 \). Find the vertex, intercepts, graph.
   - Do the “horns” of the parabola point up \( \cup \) or down \( \cap \)?
   - Write in perfect square form. Leave the constant 3 outside. Factor the 2 out of \( (2x^2 + 8x) \) then write as a difference of squares using the theorem above. If your equation looks like \( a(x + x_0)^2 - y_0 \), rewrite it in the perfect square form \( a(x - x_0)^2 + y_0 \). Note: “−” after \( x \), “+” before the constant.

- Find the vertex \((x_0, y_0)\). You must use “( )”. E.g., vertex=\((3,4)\), not vertex = 3,4. 7 symbols.
- Find the \( x \)-intercepts. Set \( y = 0 \). \( 2x^2 + 8x + 3 \) doesn’t factor, use the quadratic formula \( x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \).
  - 7 or 8 symbols counting \( \pm \) as 1 symbol. chk=5 or 7 or 9. Write \( x \)-intercepts in the form \( x = 3 \), not \( (3, 0) \).

- Find the \( y \)-intercept. Equation has 3 symbols. Write \( y \)-intercepts in the form \( y = 4 \), not \( (0, 4) \).

- Draw the graph. Label the vertex on the graph with its coordinates.