Going from standard form to vertex form is done by completing the square. Our goal is to go from an equation that looks like $y = ax^2 + bx + c$ to an equation that looks like $y = a(x - h)^2 + k$

$$y = 3x^2 + 4x + 2$$

Begin by dividing so that the 'a' term is +1

$$\frac{y}{3} = x^2 + \frac{4}{3}x + \frac{2}{3}$$

Then because the 2/3 is not completing the square move it to the other side and add in +_

$$\frac{y}{3} - \frac{2}{3} + \_\_\_\_\_ = x^2 + \frac{4}{3}x + \_\_\_\_\_$$

We now need to fill in the blanks to make the right hand side a perfect square. We do this by taking the 'b' term , multiply by ½ and then square it.

$$\frac{4}{3} * \frac{1}{2} = \frac{2}{3}^2 = \frac{4}{9}$$

$$\frac{y}{3} - \frac{2}{3} + \frac{4}{9} = x^2 + \frac{4}{3}x + \frac{4}{9}$$

Now the right hand side will factor into a squared term. But remember that instead of having to factor that the 2/3 that was squared becomes the factor.

$$\frac{y}{3} - \frac{2}{3} + \frac{4}{9} = \left(x + \frac{2}{3}\right)^2$$

Now it is just a matter of simplifying and solving for y again.

$$\frac{y}{3} - \frac{2}{9} = \left(x + \frac{2}{3}\right)^2$$

$$\frac{y}{3} = \left(x + \frac{2}{3}\right)^2 + \frac{2}{9}$$

$$y = 3\left(x + \frac{2}{3}\right)^2 + \frac{2}{3}$$

On that last step don't forget to multiply the constant term by 3 also.