

## Quadratic Functions

A. Transform each function  $y = ax^2 + bx + c$  into the form  $y = a(x + p)^2 + q$

$$y = ax^2 + bx + c$$

$$y - c = ax^2 + bx$$

$$y - c = a\left(x^2 + \frac{b}{a}x\right)$$

Process:  $y - c + \frac{b^2}{4a} = a\left(x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}\right)$

$$y + \frac{b^2 - 4ac}{4a} = a\left(x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}\right)$$

$$y = a\left(x^2 + \frac{b}{a}x + \frac{b^2}{4a^2}\right) - \frac{b^2 - 4ac}{4a} \Rightarrow y = a\left(x + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a}$$

p or h

q or k

### Assignment

1.  $y = 2x^2 + 5x - 7$

2.  $y = 5x^2 + x - 3$

3.  $y = -3x^2 - 7x + 1$

4.  $y = -7x^2 + 4x - 1$

5.  $y = x^2 + x - 3$

6.  $y = -x^2 + 2x - 5$

7.  $y = \frac{1}{2}x^2 - 3x + 5$

8.  $y = -\frac{1}{3}x^2 + 2x - 7$