

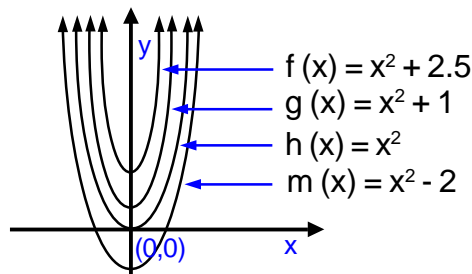


# Math Study Strategies

## Examples of Parabolas

### Parabolas that open up:

If  $a > 0$  the parabola will open **up**. The **shape** of the parabola depends on the coefficient of  $x$ . The **smaller** the coefficient, the **wider** the parabola. Conversely, the **larger** the coefficient, the **narrower** the parabola.



general form:  $y = ax^2$

$$y = ax^2 + c$$

The vertex is translated on the y-axis according to the value of  $c$  in

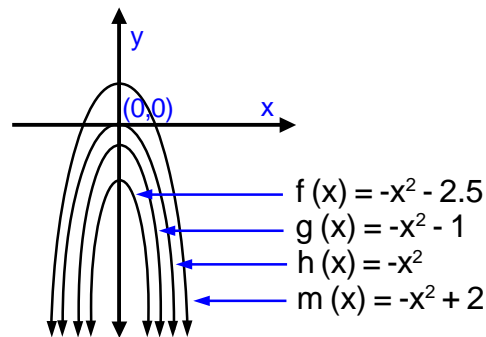
$$y = ax^2 + c$$

if  $c > 0$  the parabola is shifted **up** from the origin

if  $c < 0$  the parabola is shifted **down** from the origin

### Parabolas that open down:

If  $a < 0$  the parabola will open **down**. Again, the shape of the parabola depends on the coefficient of  $x$ . As with parabolas that open up, the **smaller** the coefficient, the **wider** the parabola. Conversely, the **larger** the coefficient, the **narrower** the parabola.



general form:  $y = -ax^2$

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

The vertex is translated on the y-axis according to the value of  $c$  in

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

if  $c > 0$  the parabola is shifted **up** from the origin

if  $c < 0$  the parabola is shifted **down** from the origin

Note that multiplying all the coefficients in the equation of a parabola by  $-1$  will give the equation of the identical parabola that opens in the opposite direction. For example, multiplying  $f(x) = x^2 + 2.5$  by  $-1$  will give  $f(x) = -x^2 - 2.5$ , as shown above.

