Discriminants and *x*-intercepts **NAME:**

There are three possibilities for the number of *x*-intercepts of a quadratic function: two, one, or zero. Fill in the following table to develop examples for these three possibilities. Choose small enough values for **a**, **b**, and **c** so that you can do the operations in your head.

Function	**Discriminant** $\mathbf{b^2 - 4ac}$	**Graph**	**Number of *x*-intercepts**
	$\mathbf{b^2 - 4ac = 0}$		
	$\mathbf{b^2 - 4ac < 0}$		
	$\mathbf{b^2 - 4ac > 0}$		

1. To form a function that will guarantee $\mathbf{b^2 - 4ac = 0}$, do the following.
   Select **b** to be an even number. Then divide $\mathbf{b^2}$ by **4**. Choose **a** and **c** so that their product is equal to the quotient $\frac{b^2}{4}$.

2. To form a function that will guarantee $\mathbf{b^2 - 4ac < 0}$, do the following.
   Select **b** to be an even number. Then divide $\mathbf{b^2}$ by **4**. Choose **a** and **c** so that their product is greater than the quotient $\frac{b^2}{4}$.

3. To form a function that will guarantee $\mathbf{b^2 - 4ac > 0}$, do the following.
   Select **b** to be an even number. Then divide $\mathbf{b^2}$ by **4**. Choose **a** and **c** so that their product is less than the quotient $\frac{b^2}{4}$.

4. For each function, calculate $\mathbf{b^2 - 4ac}$ in the second column, graph the function in the third column (standard window should be fine), and denote the number of *x*-intercepts in the fourth column.