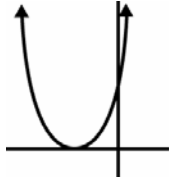
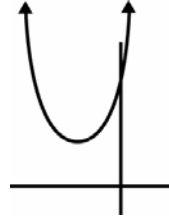
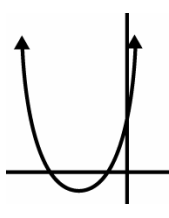


Discriminants and x -intercepts Solutions

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.

There are many correct answers here.

Function	Discriminant $b^2 - 4ac$	Graph	Number of x -intercepts
$y = 4x^2 + 4x + 1$	$b^2 - 4ac = 0$ $b^2 - 4ac$ $= 4^2 - 4(4)(1)$ $= 16 - 16$ $= 0$		1
$y = 1x^2 + 4x + 5$	$b^2 - 4ac < 0$ $b^2 - 4ac$ $= 4^2 - 4(1)(5)$ $= 16 - 20$ $= -4 < 0$		None
$y = 4x^2 + 6x + 2$	$b^2 - 4ac > 0$ $b^2 - 4ac$ $= 6^2 - 4(4)(2)$ $= 36 - 32$ $= 4 > 0$		2

1. To form a function that will guarantee $b^2 - 4ac = 0$, do the following.

Select b to be an even number. Then divide b^2 by 4. Choose a and c so that their product is equal to the quotient $\frac{b^2}{4}$.

I chose 4 for b . So b^2 is 16. Divide that by 4 and get 4. I chose a and c so that their product was 4, 4 and 1.

2. To form a function that will guarantee $b^2 - 4ac < 0$, do the following.

Select b to be an even number. Then divide b^2 by 4. Choose a and c so that their product is greater than the quotient $\frac{b^2}{4}$.

I chose 4 for b . So b^2 is 16. Divide that by 4 and get 4. I chose a and c so that their product was greater than 4, 1 and 5.

3. To form a function that will guarantee $b^2 - 4ac > 0$, do the following.

Select b to be an even number. Then divide b^2 by 4. Choose a and c so that their product is less than the quotient $\frac{b^2}{4}$.

I chose 6 for b . So b^2 is 36. Divide that by 4 and get 9. I chose a and c so that their product was less than 9, 4 and 2.

4. For each function, calculate $b^2 - 4ac$ 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.