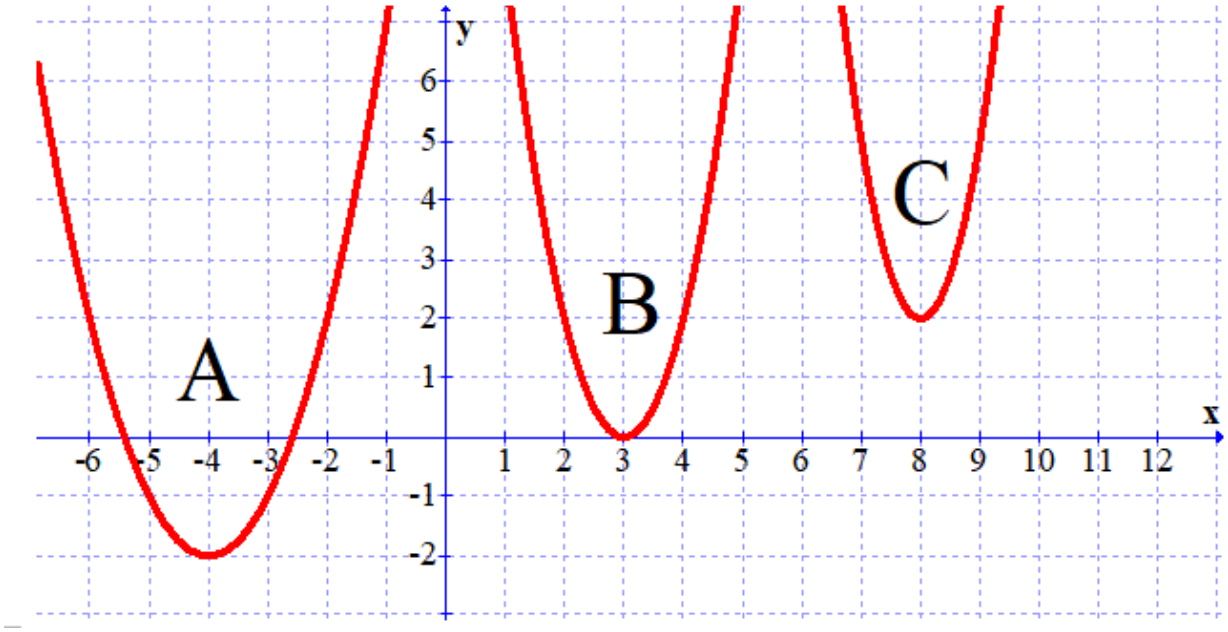
The Discriminant and Nature of the Roots Handout V2

Consider the quadratic equation, $ax^2 + bx + c = 0$, where a, b and c are real numbers and $a \neq 0$. The quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, allows us to determine the roots.

The part under the square root sign, **$b^2 - 4ac$**, is called the **discriminant**.

When graphing a quadratic function, one of three situations is possible, with respect to the x-intercepts:



	Equation	Number of x-intercepts	Value of Discriminant	Nature of the Roots
A	$y = x^2 + 8x + 14$			
B	$y = 2x^2 - 12x + 18$			
C	$Y = 3x^2 - 48x + 194$			

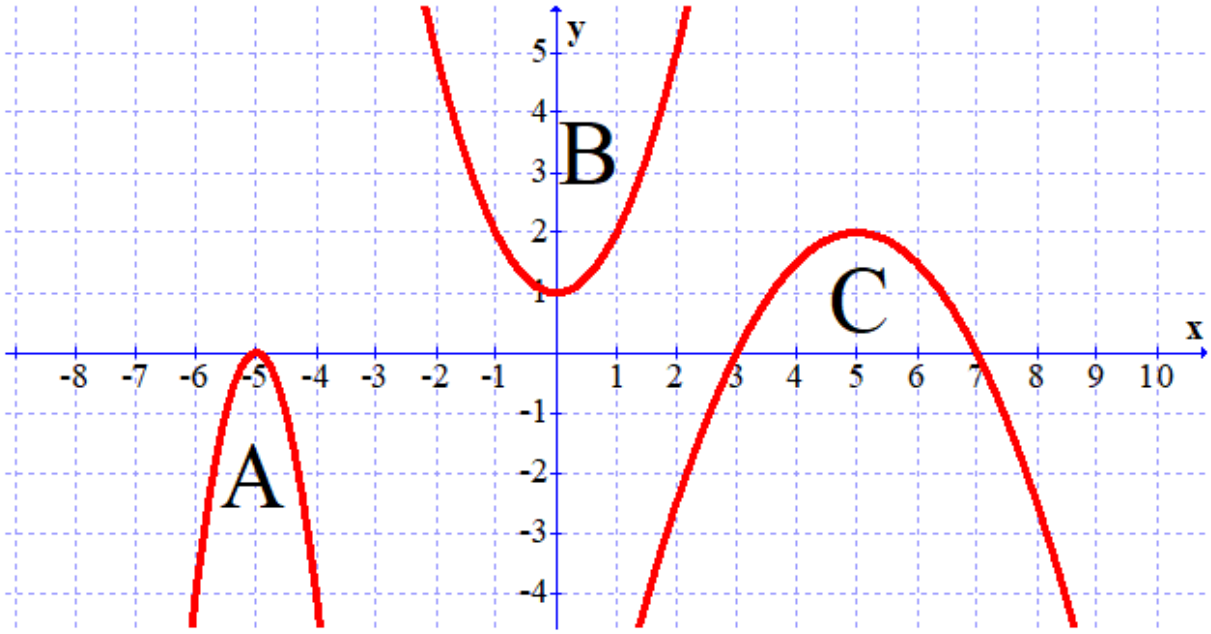
For each quadratic equation, determine the determinant and state the nature of the roots.

a) $2x^2 - 5x + 3 = 0$ b) $2x^2 - 3x = -4$ c) $4x^2 = 12x - 9$

Summary

Discriminant	Number of x-intercepts	Nature of the Roots
D > 0		
D = 0		
D < 0		

Based on the graphs below, answer the following questions:



1. Which graph has a discriminant of 0? _____
2. Which graph has no real roots? _____
3. Which graph, if shifted 4 units down, will have a discriminant > 0? _____
4. If all 3 graphs are shifted up 2 units, which 2 graphs will have 2 real roots? _____
5. Which graph, when shifted 2 units down, will have 1 distinct real root? _____

Extended Question: What is the value of 'k' if $y = 2x^2 + 5x + k$, has 1 distinct real root?