THE DISCRIMINANT

LEARNING GOALS

- Learn how to use the discriminant to determine the number of solutions to a quadratic equations.

NUMBER OF SOLUTIONS

Recall: The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant is the part inside the square root.

$$b^2 - 4ac$$

EXAMPLE

Solve the following quadratic equations using the quadratic formula and compare the number of solutions to the value of the discriminant.

$$y = (x-3)^2 + 2$$

$y = x^2 - 6x + 11$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = $ No Solutions

$b^2 - 4ac = 36 - 44$
$\qquad = -18$

$$y = -(x-2)^2 + 4$$

$y = -x^2 + 4x = x(-x + 4)$

$b^2 - 4ac = 16 - 0$
$\qquad = +16$

$$y = (x-5)^2$$

$x = 5$

$y = x^2 - 10x + 25$

$b^2 - 4ac = 0$

WHAT THE DISCRIMINANT TELLS YOU

Rule	$b^2 - 4ac > 0$	$b^2 - 4ac < 0$	$b^2 - 4ac = 0$
Number of Solutions	2	0	1

HOMEFUN ☺

P300 Q5, 10-15 – Use the discriminant!