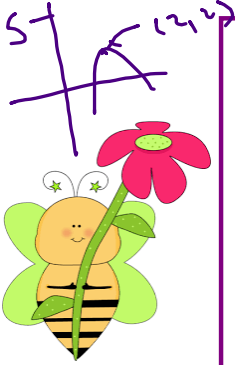


Date: _____

6.5 Interpreting Quadratic Equation Roots

We can use the quadratic formula to determine how many roots, or solutions, a quadratic equation has at a given point. To do this, we just need to look at the part of the expression under the square root symbol. This is called the discriminant (D).



Discriminant:

$$D = b^2 - 4ac$$

- If D is less than zero (negative), the quadratic equation has NO real roots.
- If D is equal to zero, the quadratic equation has ONE real root.
- If D is greater than zero (positive), the quadratic equation has TWO real roots.

Remember that you can also find the number of real roots for an equation in vertex form by looking at the signs of 'a' and 'k' (same - no real roots, opposite - two real roots, $k = 0$ - 1 real root)

Example: Without solving (or graphing) determine the number of real roots that each quadratic equation has.

Vertex

1) $-2(x - 5)^2 - 2 = 0$

$a = -2, k = -2$

Same sign

∴ no zeros.

2) $3x^2 - 8x + 1 = 0$

$D = (-8)^2 - 4(3)(1)$

$= 64 - 12$

$= 52$

$(+) \rightarrow 2 \text{ real roots}$

3) $3x^2 + 2x = 5x + 12$

$3x^2 - 3x + 12 = 0$

$D = (-3)^2 - 4(3)(12)$

$= 9 - 144$

$= -135$

$(-) \rightarrow \text{no real roots.}$

Discriminant of $ax^2 + bx + c = 0$			
	$b^2 - 4ac > 0$	$b^2 - 4ac = 0$	$b^2 - 4ac < 0$
Graph of $y = ax^2 + bx + c$			
Number of Solutions	TWO	ONE	NO