

3.7 Discriminant & # of solutions

The discriminant is $b^2 - 4ac$

If the discriminant is:	The quadratic equation has:
positive	2 real solutions
zero	1 real solution
negative	2 imaginary solutions

(EX: 1) Use the discriminant to determine the type and # of solutions.

$$5x^2 + 12x + 4 = 0$$

$a=5$ $b=12$ $c=4$

$$b^2 - 4ac$$
$$(12)^2 - 4(5)(4)$$

64 (positive)

2 real solutions

(EX 2) $-3m^2 - 1 = 0$

$a=-3$ $b=0$ $c=-1$

$$b^2 - 4ac$$
$$(0)^2 - 4(-3)(-1)$$

-12 (negative)

2 imaginary solutions

$$\text{Ex.3) } -2x^2 - x + 105 = 0$$

$$a = -2 \quad b = -1 \quad c = 105$$

2 real solutions

$$b^2 - 4ac \\ (-1)^2 - 4(-2)(105) \\ 841 \text{ (positive)}$$

$$\text{Ex.4) } x^2 + 4x = -4 \\ \quad \quad \quad +4 \quad +4$$

$$x^2 + 4x + 4 = 0$$

$$a = 1 \quad b = 4 \quad c = 4$$

1 real solution

$$b^2 - 4ac \\ (4)^2 - 4(1)(4) \\ 0 \text{ (zero)}$$