

$$1. \quad 18x^2 - 12x + 2 = 0 \quad b^2 - 4ac = 0 \quad \frac{12 \pm \sqrt{0}}{36}$$

1 sol

$$2. \quad 2x^2 + 5x + 8 = 0 \quad b^2 - 4ac = -39 \quad \frac{-5 \pm \sqrt{-39}}{4}$$

NO Sol

$$3. \quad -6x^2 - 9x + 2 = 0 \quad b^2 - 4ac = 129 \quad \frac{9 \pm \sqrt{129}}{-12}$$

Discriminate:

The Discriminant in Algebra distinguishes the number of real number solutions to the Quadratic Formula.

The part of the quadratic formula under the square root.

This determines the number of real solutions

Discriminant	# of real solutions
If $b^2 - 4ac > 0$	2 real solutions
If $b^2 - 4ac = 0$	1 real solution
If $b^2 - 4ac < 0$	No real solution

1. $0 = 7x^2 - 32x + 4$ 2. $11x^2 + 7x - 3 = 0$

3. $-2x^2 + 9x - 14 = 0$ 4. $9x^2 - 42x + 49 = 0$

5. $-x^2 + 8x + 19 = 0$

$$1. 0 = 7x^2 - 32x + 4$$

$$b^2 - 4ac = (-32)^2 - 4(7)(4) = 912$$

Since the Discriminant is Positive
the equation has 2 Real Solutions

$$2. 11x^2 + 7x - 3 = 0$$

$$b^2 - 4ac = (7)^2 - 4(11)(-3) = 181$$

Since the Discriminant is Positive
the equation has 2 Real Solutions

$$3. -2x^2 + 9x - 14 = 0$$

$$b^2 - 4ac = (9)^2 - 4(-2)(-14) = -31$$

Since the Discriminant is Negative
the equation has NO Real Solution

$$4. 9x^2 - 42x + 49 = 0$$

$$b^2 - 4ac = (-42)^2 - 4(9)(49) = 0$$

Since the Discriminant is Zero
the equation has 1 Real Solution

$$5. -x^2 + 8x + 19 = 0$$

$$b^2 - 4ac = (8)^2 - 4(-1)(19) = 140$$

Since the Discriminant is Positive
the equation has 2 Real Solutions

An object is launched upward with a velocity of 200 ft/sec from a height of 25 feet.

$$h(t) = -16t^2 + 200t + 25$$

1. Does the object ever reach a height of 500 feet?

If yes, how many times?

$$0 = -16t^2 + 200t - 475$$

2 times $b^2 - 4ac = 9600$

there are 2 real solutions and they both will be reasonable because it will reach 500 feet on the way up and again on the way down.

2. Does the object ever reach a height of 700 feet?

If yes, how many times?

NO

$$0 = -16t^2 + 200t - 675$$

$$b^2 - 4ac = -3200$$

3. Does the object ever reach a height of 650 feet?

If yes, how many times?

1 time

$$0 = -16t^2 + 200t - 625$$

$$b^2 - 4ac = 0$$