

Discriminant: b^2-4ac

- The discriminant tells you how many solutions and what type you will have.
- If the discriminant:
 - Is positive— 2 real solutions
 - Is negative— no real solutions
 - Is zero— 1 real solution
- If the solution is
 - a positive perfect square then it is rational
 - not a perfect square then it is irrational

Examples

Standard form
 $ax^2+bx+c=0$

- Find the discriminant and give the number and type of solutions.

a. $9x^2+6x+1=0$

$a=9, b=6, c=1$

$b^2-4ac=(6)^2-4(9)(1)$
 $=36-36=0$

1 real solution

* use parenthesis!

b. $9x^2+6x-4=0$

$a=9, b=6, c=-4$

$b^2-4ac=(6)^2-4(9)(-4)$
 $=36+144=180$

2 real solutions-irrational

Positive and not a perfect square

c. $9x^2+6x+5=0$

$a=9, b=6, c=5$

$b^2-4ac=(6)^2-4(9)(5)$
 $=36-180=-144$

no real solutions

Finding and Using the Discriminant - Guided Lesson

Complete the following problems: $ax^2 + bx + c = 0$

1) Find the value of the discriminant. $b^2 - 4ac$

$$6n^2 - 3n + 7 = 0$$

$$a=6 \quad b=-3 \quad c=7$$

$$(-3)^2 - 4(6)(7) = \boxed{-159}$$

← Value of the discriminant

No real solution because the value is less than zero (negative).



2) Find the value of the discriminant.

$$4d^2 + 9d - 9 = 0$$

$$a=4 \quad b=9 \quad c=-9$$

$$(9)^2 - 4(4)(-9) = \boxed{225}$$

Value

2 rational solutions because the value is positive and a perfect square.

3) Find the value of the discriminant.

$$3w^2 - 8w + 2 = 0$$

$$a=3 \quad b=-8 \quad c=2$$

$$(-8)^2 - 4(3)(2) = \boxed{40}$$

value

2 irrational solutions because the value is positive and not a perfect square.



Finding and Using the Discriminant - Matching Worksheet

$$b^2 - 4ac$$

Match the equation to the value of its discriminant.

i 1. $6b^2 + 4b - 2 = 0$ $(4)^2 - 4(6)(-2) = \boxed{64}$

a. -8

d 2. $9m^2 - 7m + 5 = 0$ $(-7)^2 - 4(9)(5) = \boxed{-131}$

b. -144

h 3. $3h^2 + 6h - 4 = 0$ $(6)^2 - 4(3)(-4) = \boxed{84}$

c. 156

a 4. $2g^2 - 4g + 3 = 0$ $(-4)^2 - 4(2)(3) = \boxed{-8}$

d. -131

g 5. $5t^2 + t - 2 = 0$ $(1)^2 - 4(5)(-2) = \boxed{41}$

e. 337

b 6. $8a^2 - 4a + 5 = 0$ $(-4)^2 - 4(8)(5) = \boxed{-144}$

f. -68

j 7. $7k^2 + 3k - 4 = 0$ $(3)^2 - 4(7)(-4) = \boxed{121}$

g. 41

c 8. $5c^2 + 4c - 7 = 0$ $(4)^2 - 4(5)(-7) = \boxed{156}$

h. 84

f 9. $6d^2 - 2d + 3 = 0$ $(-2)^2 - 4(6)(3) = \boxed{-68}$

i. 64

e 10. $9y^2 + 7y - 8 = 0$ $(7)^2 - 4(9)(-8) = \boxed{337}$

j. 121

