

## 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

- 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

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

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

Name \_\_\_\_\_

Date \_\_\_\_\_

### Finding and Using the Discriminant - Guided Lesson

Complete the following problems:

1) Find the value of the discriminant.

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



2) Find the value of the discriminant.

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

3) Find the value of the discriminant.

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



Name \_\_\_\_\_

Date \_\_\_\_\_

### Finding and Using the Discriminant - Matching Worksheet

Match the equation to the value of its discriminant.

1.  $6b^2 + 4b - 2 = 0$

\_\_\_\_\_

2.  $9m^2 - 7m + 5 = 0$

\_\_\_\_\_

3.  $3h^2 + 6h - 4 = 0$

\_\_\_\_\_

4.  $2g^2 - 4g + 3 = 0$

\_\_\_\_\_

5.  $5t^2 + t - 2 = 0$

\_\_\_\_\_

6.  $8a^2 - 4a + 5 = 0$

\_\_\_\_\_

7.  $7k^2 + 3k - 4 = 0$

\_\_\_\_\_

8.  $5c^2 + 4c - 7 = 0$

\_\_\_\_\_

9.  $6d^2 - 2d + 3 = 0$

\_\_\_\_\_

10.  $9y^2 + 7y - 8 = 0$

\_\_\_\_\_

a. -8

b. -144

c. 156

d. -131

e. 337

f. -68

g. 41

h. 84

i. 64

j. 121



Find the discriminant, and then describe the solutions.  $b^2 - 4ac$

Equation	Work	Discriminant	Types of Solutions
1. $x^2+5x+1=0$			
2. $x^2+2x+6=0$			
3. $x^2+6x+9=0$			

Understanding the Discriminant  $b^2 - 4ac$ 

Find the value of the discriminant of each quadratic equation.

1)  $6p^2 - 2p - 3 = 0$

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

3)  $-4m^2 - 4m + 5 = 0$

4)  $5b^2 + b - 2 = 0$

5)  $r^2 + 5r + 2 = 0$

6)  $2p^2 + 5p - 4 = 0$

Find the discriminant of each quadratic equation then state ~~the number of real and imaginary solutions~~ <sup>zero</sup> <sup>Positive</sup> <sup>Negative</sup>  
 1 real, 2 real, or no real solutions

7)  $9n^2 - 3n - 8 = -10$

8)  $-2x^2 - 8x - 14 = -6$

9)  $9m^2 + 6m + 6 = 5$

10)  $4a^2 = 8a - 4$

11)  $-9b^2 = -8b + 8$

12)  $-x^2 - 9 = 6x$

## Using the Quadratic Formula

Find the discriminant of each Quadratic equation then state:

Date \_\_\_\_\_

Period \_\_\_\_\_

Solve each equation with the quadratic formula.

1 real (zero), 2 real (positive),

no real (negative)

1)  $v^2 + 2v - 8 = 0$

2)  $k^2 + 5k - 6 = 0$

3)  $2v^2 - 5v + 3 = 0$

4)  $2a^2 - a - 13 = 2$

5)  $2n^2 - n - 4 = 2$

6)  $b^2 - 4b - 14 = -2$

7)  $8n^2 - 4n = 18$

8)  $8a^2 + 6a = -5$

9)  $10x^2 + 9 = x$

10)  $n^2 = 9n - 20$

11)  $3a^2 = 6a - 3$

12)  $x^2 = -3x + 40$

13)  $9x^2 - 11 = 6x$

14)  $4a^2 - 8 = a$

15)  $14m^2 + 1 = 6m^2 + 7m$

16)  $4x^2 + 4x - 8 = 1$