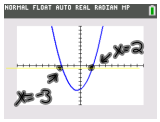
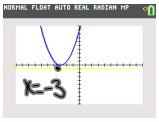
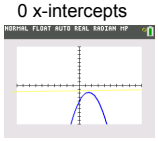
DISCRIMINANT: $b^2 - 4ac$

The discriminant determines the number and type of solutions of any quadratic ($y=x^2$) (remember to set the equation = 0 first)

What is a solution/root/zero? x-intercept ("y=0", a is a number)

Discriminant	# of roots	types of roots
-Positive	**2**	**real**
(if the discriminant is a perfect square the roots are rational and the equation can be factored...and if not a perfect square the roots are irrational)	ex) 9, 16	ex) $1, \frac{3}{5}, -7$ / ex) $\pi = 3.14\ldots$, $\sqrt{2} = 1.41\ldots$
-Zero	**1**	**real**
(this is a called a double root...where the graph "bounces" off of the x-axis)		rational
-Negative	**0**	**real**
(no real roots means there must be 2 complex or imaginary)		

2 x-intercepts	1 x-intercept	0 x-intercepts
		
How many and what type of solutions: 2, real + rational	How many and what type of solutions: 1, real + rational	How many and what type of solutions: 2 complex roots
What kind of discriminant: positive	What kind of discriminant: zero	What kind of discriminant: negative

P-55

Name _____ Period _____

5.3A *Number and Type of Solutions: Part I*

1. What is the discriminant? What does it do?

$b^2 - 4ac$

#2 – 9: Find the discriminant, the number of solutions and the type of solutions for each equation.

2. $x^2 + 6x + 10 = 0$

$a = 1$, $b = 6$, $c = 10$

$(6)^2 - 4(1)(10)$

discriminant: -4

number of solutions: 2

type of solutions: complex

3. $3x^2 + 2x = 1$

$-1 \quad -1$

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

$a = 3$ $b = 2$ $c = -1$

discriminant: 16

number of solutions: 2

type of solutions: rational

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

$a = 1$, $b = -4$, $c = 4$

discriminant: 0

number of solutions: 1

type of solutions: rational

$(-4)^2 - 4(1)(4)$

5. $12x^2 = 11x + 2$

$0 = -12x^2 + 11x +$

$a = -12$, $b = 11$, $c = 2$

discriminant: 217

number of solutions: 2

type of solutions: irrational

P-56

Name _____ Period _____

5.3A *Number and Type of Solutions: Part I*

#2 – 9 (continued): Find the discriminant, the number of solutions and the type of solutions for each equation.

6. $8x+1=-16x^2$ $16x^2+8x+1=0$ **7.** $7x^2+16x+11=0$

$a=16$
$b=8$
$c=1$

discriminant: 0
number of solutions: 1
type of solutions: rational

discriminant: _____
number of solutions: _____
type of solutions: _____

8. $5x^2-11x+6=0$

discriminant: _____
number of solutions: _____
type of solutions: _____

9. $0=4x^2+5x+2$

discriminant: _____
number of solutions: _____
type of solutions: _____

10. On a quiz, Brittani used the discriminant to find the number and type of solutions. Find her mistake and find the correct solution.

$0=x^2-6x+5$

b^2-4ac
$-6^2-4(1)(5)$
$-36-20$

discriminant: -56
solutions: 2 imaginary solutions

Name _____ Period _____

5.3B *Number and Type of Solutions: Part II*

1. $y=x^2-2x-8$

a) What is the discriminant?

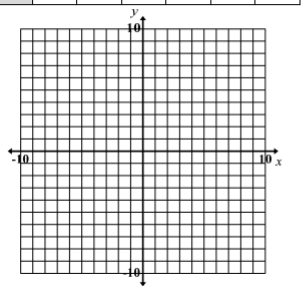
b) Number of solutions?

c) Type of solutions?

d) What are the zeros (roots)?
*Factor or use the graph

e) Graph the equation.

x						
y						



f) What is the vertex?

g) Is the vertex a minimum or maximum?

h) What is the y-intercept?

i) What is the domain?

j) What is the range?

2. $y=9-x^2$ $y=-x^2+0x+9$

a) What is the discriminant?

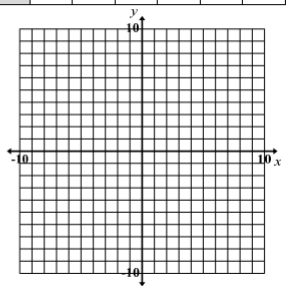
b) Number of solutions?

c) Type of solutions?

d) What are the zeros (roots)?
*Factor or use the graph

e) Graph the equation.

x						
y						



f) What is the vertex?

g) Is the vertex a minimum or maximum?

h) What is the y-intercept?

i) What is the domain?

j) What is the range?