5.3B Number and Type of Solutions: Part II

Section 5.3B

page 47

From the work we did in section **5.3A**, we found the following:

You can use the sign of the discriminant, $b^2 - 4ac$, to determine the number of real solutions to a quadratic equation in the form $ax^2 + bx + c = 0$, where $a \neq 0$. If the equation has a positive discriminant, there are two real solutions. A negative discriminant yields no real solutions but two complex solutions. Finally a discriminant equal to zero yields only one real solution.

1) Find a possible discriminant value for the following quadratic situations:

a) two real, irrational solutions 3, 5, 340

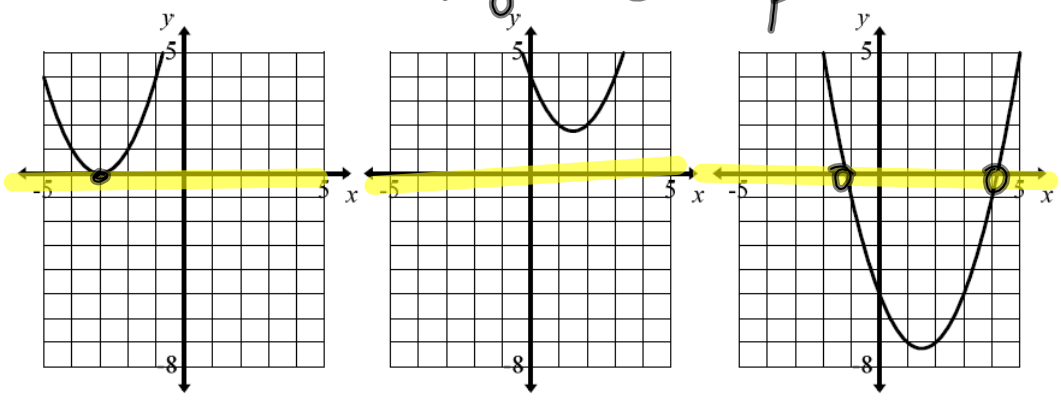
b) two real, rational solutions 4, 16, 9, 25, 36

c) one real solution 0

d) two complex, OR real -3, -28, -63

3) Label each graph below as having a **positive**, **negative**, or **zero** discriminant.

a) zero **b)** negative **c)** positive



Standard Form: $y = ax^2 + bx + c$

* If "a" is POSITIVE = graph opens up (vertex is a minimum)
* If "a" is NEGATIVE = graph opens down (vertex is a maximum)

* Use "b" to find the vertex

* Use "c" for the y-intercept (0,c)

Factored Form: $f(x) = a(x - m)(x - n)$

$(x+1)$ $x=-1$

$(x-1)$ $x=1$

"a" - whether the function opens up or down
"m" - one of the "zeros" or "x intercepts"
so x - m = 0 and solve for m ⟶ (m,0)
"n" - one of the "zeros" or "x intercepts"
so x - n = 0 and solve for n ⟶ (n,0)

*Think m is the "opposite" sign

*Think n is the "opposite" sign

Vertex Form: $y = a(x - h)^2 + k$ (h, k)

* If "a" is POSITIVE = graph opens up (vertex is a minimum)
* If "a" is NEGATIVE = graph opens down (vertex is a maximum)

h is the x coordinate of the vertex

*Think h is the "opposite" sign

k is the y coordinate of the vertex

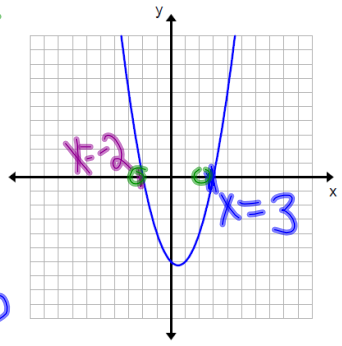
* number within the parentheses, will be the opposite

4) What type of discriminant does equation of the graph have? Write an equation to model the graph pictured.

a) Discriminant positive

b) Number and type of solutions 2 real

c) Possible Equation $y = x^2 - x - 6$



$x = -2$ $x = 3$

$+2 \quad +2$ $\quad -3 \quad -3$

$x + 2 = 0$ $\quad x - 3 = 0$

$(x+2)(x-3) = 0$

$x^2 + 2x - 3x - 6 = 0$

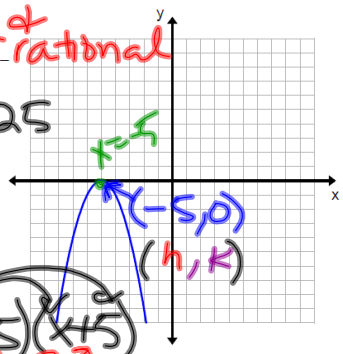
$x^2 - x - 6 = 0$

5) What type of discriminant does equation of the graph have? Write an equation to model the graph pictured.

a) Discriminant zero

b) Number and type of solutions 1 Real & rational

c) Possible Equation $y = -x^2 - 10x - 25$



$a = -1$

$y = -1(x-(-5))^2 + 0$

$= -1(x+5)^2 = -1(x+5)(x+5)$

$= -1(x^2+5x+5x+25)$

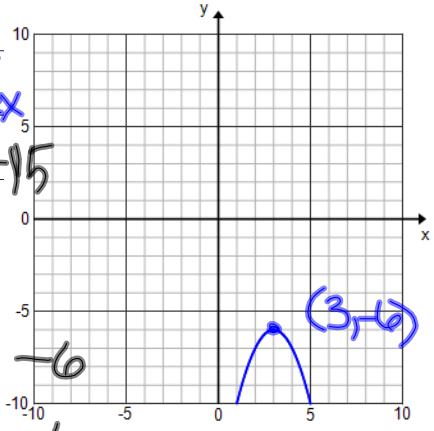
$= -1(x^2+10x+25) = -x^2-10x-25$

What type of discriminant does equation of the graph have? Write an equation to model the graph pictured.

a) Discriminant negative

b) Number and type of solutions 2 complex

c) Possible Equation $y = -x^2+6x-15$



$a = -1$

$y = -1(x-3)^2 - 6$

$= -1(x-3)(x-3) - 6$

$= -1(x^2-6x+9) - 6$

$= -x^2+6x-9-6$

$= -x^2+6x-15$

April 07, 2015

Homework Assignment

On the back of the worksheet, cross out "find" and replace with "label"