WELCOME

15.5:

Use the Quadratic Formula to find Real/imaginary Zeroes

Warm Up

1) Write the following as a fraction:

a) .757575...

2) Simplify each of the following:

a) $\sqrt{-81}$

b) $5+\sqrt{-63}$

3) Simplify each power of i:

a) i^{264}

b) i^{59}

4)Simplify completely:

a) $5i(3+2i)$

b) $(3i+5)(3i-5)$

15.5: Learning Targets

- **Determine the number of real/imaginary roots in a quadratic based on graph.**

- **Use Quadratic Formula to find the real/imaginary zeroes**

- **Use the discriminate to find the number of real/imaginary roots.**

Solving Quadratic w/ Imaginary Zeroes

A negative inside the radical no longer means no solution!

We now know that it means that there are 2 complex solutions.

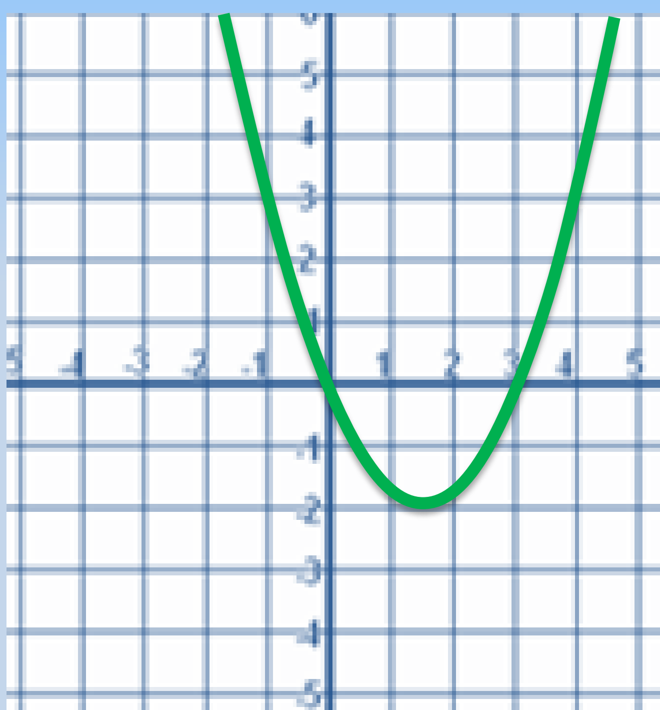
$$\boldsymbol{f}(\mathbf{x}) = \mathbf{x}^2 + 2\mathbf{x} + 5$$

Determine # of Zeroes from a Graph

Given the graph of a quadratic we can easily determine the number and type of zeroes based on the x-int.

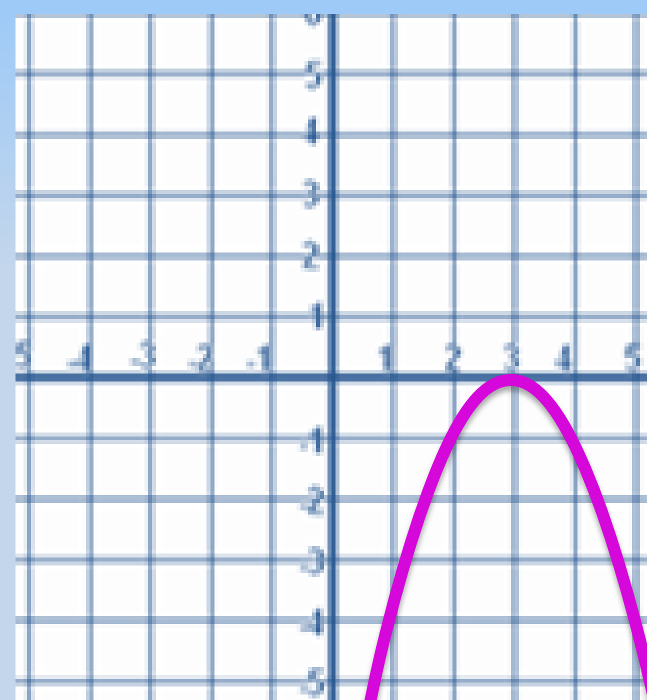
Hits x-axis Twice

Then the quadratic will have two real solutions



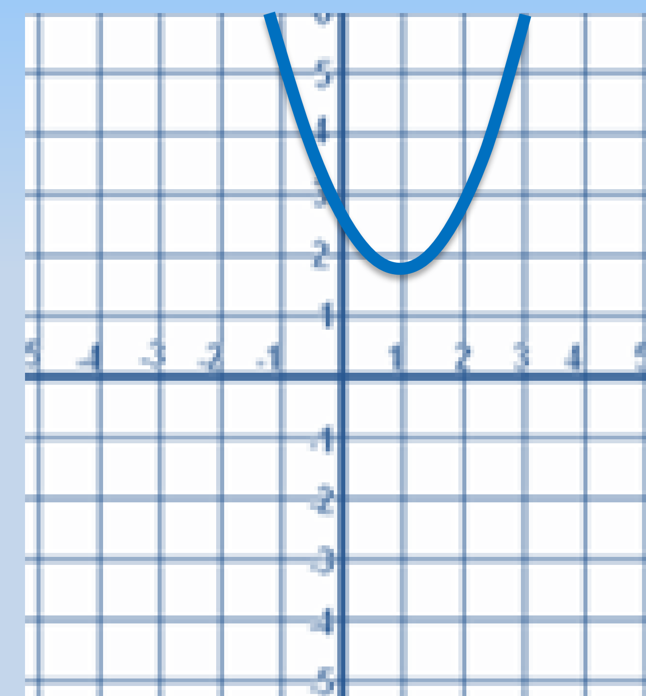
Hits x-axis Once

Then the quadratic will have one real solution.



Doesn't hit x-axis

Then the quadratic has two complex solutions.

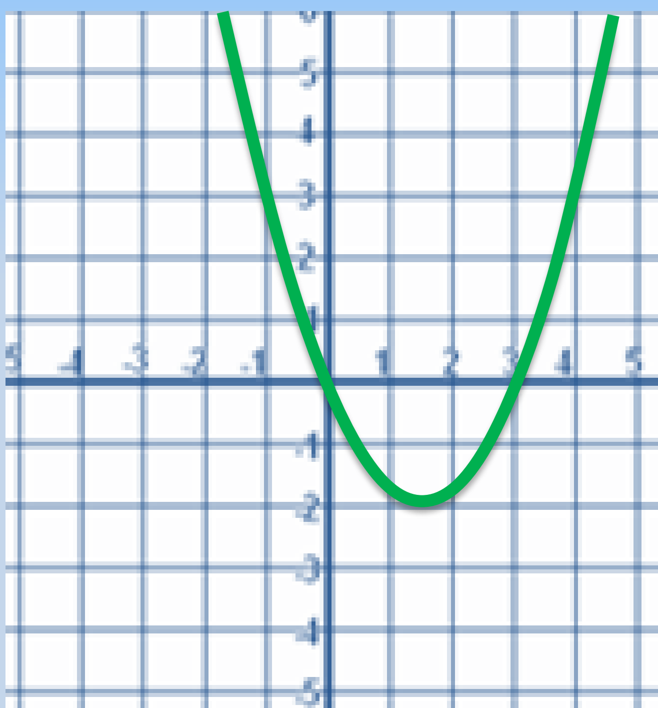


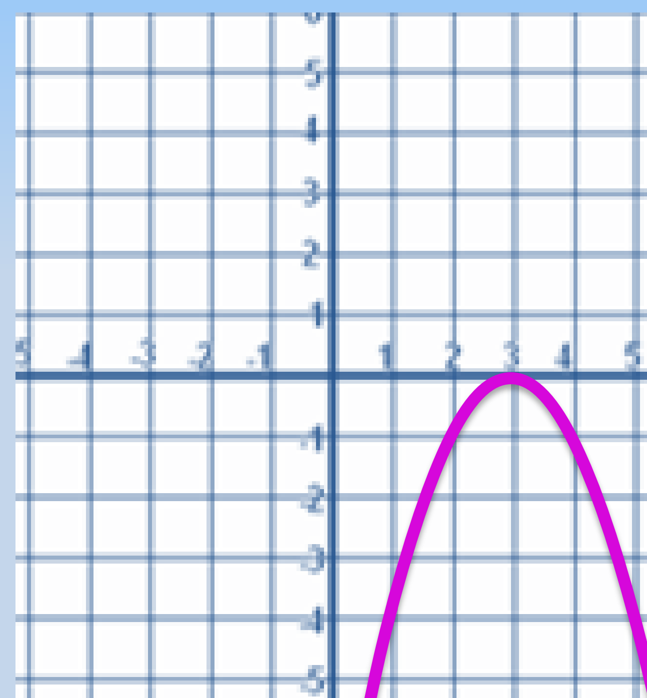
Discriminant to Determine Zeroes

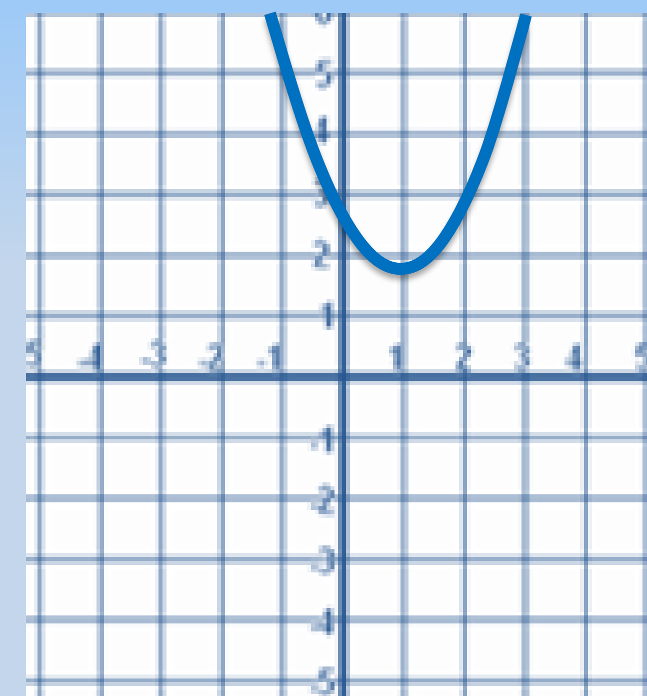
Given a quadratic $f(x) = ax^2 + bx + c$ …

Discriminant = $b^2 - 4ac$

$b^2 - 4ac$ = Positive	$b^2 - 4ac$ = zero	$b^2 - 4ac$ = Negative
Then the quadratic will have <u>two real solutions</u>	Then the quadratic will have <u>one real solution</u>	Then the quadratic has <u>two complex solutions</u>







Try it…

- $\boldsymbol{f}(\mathbf{x}) = \mathbf{x}^2 + \mathbf{4x} + \mathbf{8}$