

Name: \_\_\_\_\_ Class: \_\_\_\_\_

Topic: DAY 3 Quadratic Roots Date: \_\_\_\_\_

Main Ideas/Questions	Notes
Definition	the point at which the parabola intersects the x-axis.
Also called...	zeros, solutions, x-intercepts
Number of REAL Solutions	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>2 SOLUTIONS</p> </div> <div style="text-align: center;"> <p>1 SOLUTION</p> </div> <div style="text-align: center;"> <p>NO SOLUTION</p> </div> </div> <p style="text-align: right; color: blue;">imaginary solutions</p>
Examples	<p>Find the solutions of the following quadratics by graphing.</p> <p>Solutions:</p> <p>1. <math>x = -5, 1</math></p> <p>2. <math>x = 1</math> double root!</p> <p>3. <math>x = 0</math></p>

1.  $y = x^2 + 4x - 5$

AOS:  $\frac{-4}{2(1)} = -2 = x$

Vertex:  $(-2, -9)$

$(-2)^2 + 4(-2) - 5 = y$   
 $-9 = y$

x	y
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0

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

AOS:  $\frac{2}{2(1)} = 1 = x$

Vertex:  $(1, 0)$

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

x	y
-2	9
-1	4
0	1
1	0
2	1
3	4
4	9

3.  $y = -x^2 + 2x - 3$

AOS:  $\frac{2}{2(-1)} = -1 = x$

Vertex:  $(1, -2)$

$(-1)^2 + 2(-1) - 3 = y$   
 $-2 = y$

x	y
-2	-11
-1	-6
0	-3
1	-2
2	-3
3	-6
4	-11

Solutions:	4. $y = x^2 - 10x + 16$	<table border="1"><tr><th>x</th><th>y</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	x	y						
x	y									
	5. $y = -x^2 + 9$	<table border="1"><tr><th>x</th><th>y</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	x	y						
x	y									
	6. $y = -3x^2 + 6x$	<table border="1"><tr><th>x</th><th>y</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	x	y						
x	y									
The Discriminant	<p>Formula: <math>b^2 - 4ac = d</math></p> <p>If <math>d &gt; 0</math>, then there are <u>2</u> solutions.</p> <p>If <math>d = 0</math>, then there are <u>1</u> solutions.</p> <p>If <math>d &lt; 0</math>, then there are <u>0</u> solutions.</p> <p style="text-align: right; color: blue;">double root imaginary</p>									
Examples	<p>7. <math>y = x^2 + 5x + 4</math></p> <p><math>5^2 - 4(1)(4) = 9 = d</math></p> <p><math>d &gt; 0 \rightarrow 2 \text{ Sol.s}</math></p>	8. $y = x^2 - 3x + 10$								
	<p>9. <math>y = x^2 + 10x + 25</math></p> <p><math>d = 10^2 - 4(1)(25)</math></p> <p><math>d = 0 \rightarrow 1 \text{ Sol. root}</math></p>	10. $y = 2x^2 - 4x - 3$								
	11. $y = 4x^2 - 12x + 9$	12. $y = -3x^2 + 5x - 8$ <p><math>5^2 - 4(-3)(-8) = -71</math></p> <p><math>d &lt; 0 \rightarrow \text{no real Sol.s}</math> (imaginary)</p>								