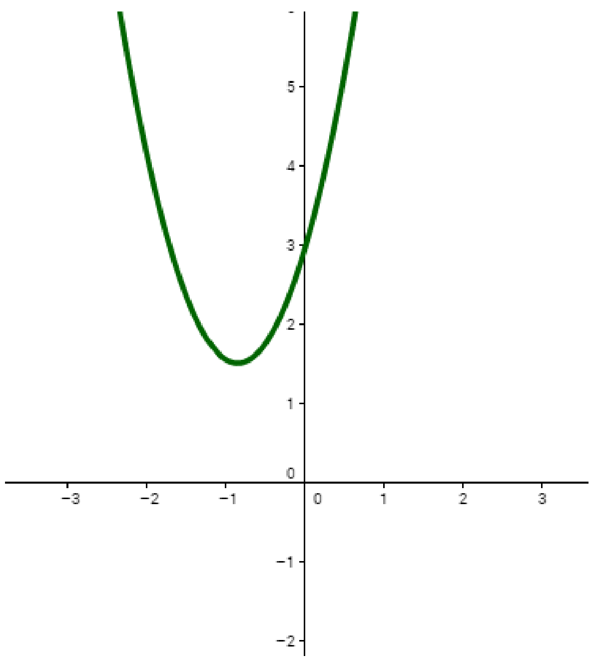
Name:
Date:

Algebra II Unit 1: Quadratics Revisited

1. Which of the following quadratic equations has no real solutions?
   A. $x^2 = 0$
   B. $3x^2 - 16 = 0$
   C. $2x^2 + x + 4 = 0$
   D. $2x^2 - 2x - 5 = 0$

2. The graph below represents a second degree polynomial in one variable.



Describe the solutions of this graph.

   A. One real solution
   B. Two real solution
   C. One complex solution
   D. Two complex solution

3. What is the simplified form of $i^3\sqrt{-4}$?

4. Simplify $(2+3i)(4-5i)$.

5. Simplify $(6+i)-(2+8i)$.

6. Simplify $5i(3-4i)$.

7. Write the expression as a complex number in standard form $\frac{3-9i}{2+3i}$.

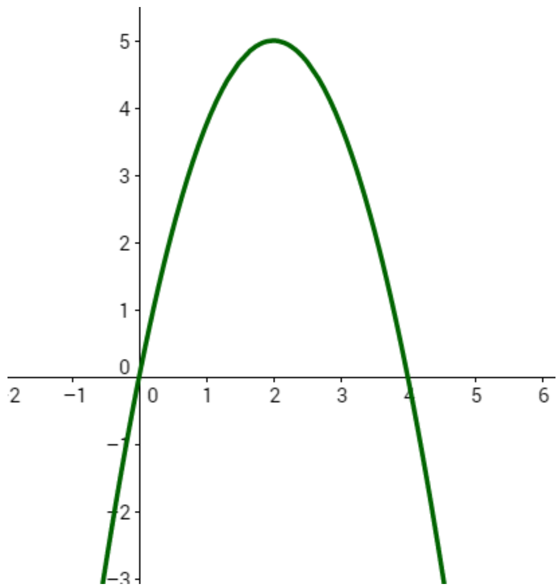
8. Factor x^2+81 over the set of complex numbers.
   A. $(x+9)(x-9)$
   B. $(x+9i)(x+9i)$
   C. $(x+9i)(x-9i)$
   D. $(x-9i)(x-9i)$

9. Let a and b be any real numbers. Simplify the product $(a+bi)(a-bi)$.

10. Solve $x^2+2x+1=0$

11. Solve $x^2 + 1 = 0$

12. What are the solution(s) to the graph below



13. Write the radical expression in rational exponent form. $\sqrt[7]{a}$

A. a^7

B. $a^{\frac{1}{7}}$

C. 7^a

D. $\left(\frac{1}{7}\right)^a$

14. Simplify $16^{\frac{3}{2}}$

15. Simplify $\left(\sqrt[3]{x^6y^3}\right)^2$

16. Consider the equation $10x^2+6x-5=8x^2+5x-12$.

A. Rewrite the equation in the form $ax^2+bx+c=0$.

B. Describe the solution(s) of the equation as real or non-real.

C. Solve the equation over the set of complex numbers.

Unit 1: Quadratics Revisited Blueprint

AKS	Question Number(s)
N.CN.7 Solve quadratic equations with real coefficients that have complex solutions. - Be sure to connect complex solutions to the graphs and examples using the quadratic formula.	1,2,16
N.CN.1 Know there is a complex number I such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.	3
N.CN.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex number	4,5,6
N.CN.3 Find the conjugate of a complex number; use conjugates to find quotients of complex numbers.	7
N.CN.8 Extend polynomial identities to the complex numbers (e.g., rewrite x^2+4 as $(x+2i)(x-2i)$).	8,9
A.REI.4_b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. -Connect the solutions to the graph and real life application	10,11,12
N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	13
N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	14,15

Answer Key

1. **C**
2. **D**
3. **2**
4. **23 +2*i***
5. **4 – 7*i***
6. **20 + 15*i***
7. $-\frac{21}{13}-\frac{27}{13}i$
8. **C**
9. **$a^2 + b^2$**
10. **x = -1**
11. **x = *i* and x =-*i***
12. **{0,4}**
13. **B**
14. **64**
15. **$x^4 y^2$**
16.
    a. **$2x^2 + x + 7 = 0$**
    b. $\sqrt{1^2-4(2)(7)}=\sqrt{-55}$ **. Since** $\sqrt{-55}$ **is not a real number, the equation has two non-real solutions.**
    c. $\frac{-1\pm\sqrt{55}i}{4}$