Alg 4 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

 WS Assessment

 Target 13:

Imaginary and complex roots

**I can:**

* Perform operations on complex numbers (including conjugate)
* Solve quadratic equations with complex solutions
* Recognize when a polynomial would have complex roots

 **Unit 5: Quadratic and Complex number**

* [**HSN.CN.A.1**](http://www.corestandards.org/Math/Content/HSN/CN/A/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.
* [**HSN.CN.A.2**](http://www.corestandards.org/Math/Content/HSN/CN/A/2/): Use the relation *i*2 = -1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
* [**HSN.CN.C.7**](http://www.corestandards.org/Math/Content/HSN/CN/C/7/): Solve quadratic equations with real coefficients that have complex solutions.

HW# 13 Complex number www.deltamath.com

Imaginary number

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *i1* = | *i2* =  | *i*3 = | *i4* = |  | *i17* | *i35* | *i98* | *i121* |
|  |  |  |  |  |  |  |  |  |
| *i5* | *i6* | *i7* | *i8* |  | *i164* | *i1640* | *i16402* | *i164027* |
|  |  |  |  |  |  |  |  |  |

Rewrite the following negative radical as imaginary number

Evaluate the following

3(2i) = (3i)(2i)= (4i)2 =

(2i)2(5i) = (3i)3 = (4i)4 =

*Complex number is the combination of real number and imaginary number.* It is written as a + bi

For example 5 + 3i Rewrite the following as complex number.

 =

Complex number are “binomials” of a sort, and are added, subtracted, and multiplied in a similar way. (Division is a bit different)

|  |  |
| --- | --- |
| **Add** | **Subtract** |
| (2 + 3i) + (1 – 6i) = | (2 + 3i) – (1 – 6i) = |
| (3 + 2i) + (6 – i) = | (3 + 2i) – (6 – i) = |
| (2.1 + .3i) + (2i – 1) = | (2.1 + .3i) – (2i – 1) = |

**Multiply**: Use the generic rectangle (the box)

(2 – i)(3 + i) (3 – 5i)(3 + 5i)

(4 – i)(2i + 6) (7 – 2i)(2i + 7)

Show me on calculator for stamp

Complex Conjugate and divide complex number

The Complex Conjugate of **a + bi** is **a – bi**, you just change the sign to its opposite.

Write the conjugate for the following

4 + i → 2 + 7i → 3 – 5i → a – bi →

**Divide** complex number. Steps: find conjugate of the denominator this conjugate to both top and bottom of the fraction, simplify the result if needed.

Complex plane

|  |  |
| --- | --- |
| The number - 4 + 4i is already graph on the complex plane. Base on this graph the following points. Show workA = 5 – 5i B = (1 - 2i) + (-5 + 4i)C = (-1 + 2i) (2 - .5i)   |  |

Complex roots

1. How is complex root look like? Sketch the following

Real roots (x + 5)2 – 4 = 0 Complex roots (x + 5)2 + 4 = 0

Solve Solve

Solve the following quadratic equation by formula and squaring (complete the square). Remember, they all have solutions now, either real or complex

a. x2 – 10x + 29 = 0 b. x2 – 2x + 10 = 0

c. 2x2 + 5x + 4 = 0 d. x2 – 8x + 25 = 0

Solve a quadratic equation by formula, squaring and programming (stamp)

2x2 – 9x + 15 = 0

Rectangular a + bi vs Polar form r(cos

|  |  |
| --- | --- |
|  |  |

Convert from rectangular to polar form

Write the complex number in polar form and graph it

-2 – 2i 2 + 2i -2 + 3i

Convert from polar to rectangular form a = r cos b = r sin

Write the complex number in rectangular form and graph it

2(cos 60o + i sin 60o) 6(cos 30o + i sin 30o)

**Assessment Target 13
I can…** perform basic operations on complex number and solve for complex roots

Write 2 complex numbers in from of a + bi (a ). Different from group

 A = \_\_\_\_\_\_\_\_\_\_\_\_ B = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now do the following

A + B A – B (A)(B) AB

Graph the result in the complex plan (you choose the scale)

(A)(B) AB

Convert your rectangular form in to polar from

A = B =

Write the quadratic equation in the form of 2x2 + \_\_\_x + \_\_\_\_\_ = 0 then solve for complex root with at formula and squaring. (If you do not have complex root, then change the equation until you get one). Check by programming (stamp)