

Lesson 31- Objective: SWBAT complete operations with complex numbers.

1) Given the root  $(-4 \pm 3i\sqrt{10})$  find the function of the polynomial. *\*Standard\**

2) Given the function  $f(x) = 3x^2 - 5x + 3$  use the rational zero test to list all possible zeros. Then use the graph and Remainder Theorem to synthetically divide to find all the rational zeros. List all linear factors and zeros.

①  $x = -4$   
 $x + 4 = 0$   
 $x^2 - 6x + 1 = 0$   
 $(x+4)(x^2 - 6x + 1)$   
 $x^2 - 6x + 1 = 0$   
 $x^2 - 6x^2 - x + 4x^2 - 24x - 4$   
 $f(x) = x^2 - 2x^2 + 25x - 4$

②  $f(x) = 3x^2 + 5x + 3$   
 $\pm 3, \pm 1 \rightarrow 1, 3, -3, \frac{1}{3}, \frac{1}{3}$   
 $\pm 3, \pm 1$  Possible zeros

1 | 3 5 -11 3  
 ↓ 3 8 -3  
 5 8 -2 0  
 $3x^2 + 9x - 3$   
 $3x^2 + 9x - x - 3$   
 $3x(x+3) - 1(x+3)$   
 Linear factors  $(x-1)(x+3)(x+3)$   
 $x-1=0 \rightarrow x=1$   
 $x+3=0 \rightarrow x=-3$   
 Zeros  $x=1, x=-3, x=-3$

## HW ODDS!

Operations with Complex Numbers

Review! Perform each of the indicated operations.

1)  $(3 + \sqrt{-4}) + (4 - \sqrt{-25})$       2)  $(5 - \sqrt{-36}) - (3 - \sqrt{-4})$

3)  $\sqrt{-25}(4 - \sqrt{-125})$       4)  $(5 - \sqrt{-36})(2 + 4i^3)$

5)  $\frac{\sqrt{-20}}{\sqrt{-5}}$       6)  $\frac{9i^7 - 18i^5}{3i}$

7)  $(6 + \sqrt{-4})(6 - \sqrt{-4})$       8)  $(5 + \sqrt{-18})^2$

9)  $(4 - \sqrt{-20}) - (3 + \sqrt{-180})$       10)  $\frac{8i^2 - 20i^7}{6i^9}$

11)  $\frac{\sqrt{-8}}{\sqrt{-100}}$       12)  $(3 + 4i)(3 - 4i)$

13)  $(2 + 3i\sqrt{7}) + (4 - 5i\sqrt{7})$       14)  $(-1 + \sqrt{-8}) + (8 - \sqrt{-50})$

15)  $(3 + \sqrt{-5})(7 - \sqrt{-10})$       16)  $(7 + \sqrt{-18}) + (3 + \sqrt{-32})$

17)  $(4 + 5i)^2 - (4 - 5i)^2$       18)  $(1 + i)(3 - 2i)$

19)  $\frac{-6i^{12} + 48i^6}{8i^4}$       20)  $4i(8 + 5i)$

21)  $\frac{\sqrt{-250}}{\sqrt{-10}}$

22)  $4i^2 - 2i^3$

23)  $\frac{8i^8 - 72i^4}{8i^2}$

24)  $(3 - \sqrt{-48})(\sqrt{-72} - 1)$