

Day 5: Imaginary and Complex Numbers

Date _____

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What is an imaginary number?

1) An imaginary number is created when _____

Check out this great website as a resource:

<http://www.mathsisfun.com/numbers/imaginary-numbers.html>

So this means that $i = \sqrt{-1}$.

2) Imaginary numbers follow a pattern with their exponents:

$$i = \sqrt{-1}$$

$$i^2 =$$

$$i^3 =$$

$$i^4 =$$

3) Then it repeats:

$$i^5 =$$

$$i^6 =$$

$$i^7 =$$

$$i^8 =$$

4) After what power do the imaginary numbers start to repeat?

Simplify the following.

5) i^0

6) i^{57}

7) i^{34}

8) i^{85}

9) i^{47}

10) i^{12}

Rewrite the following as imaginary.

11) $\sqrt{-25}$

12) $\sqrt{-81}$

13) $\sqrt{-121}$

14) $\sqrt{-9}$

15) $\sqrt{-32}$

16) $\sqrt{-45}$

17) $\sqrt{-11}$

18) $\sqrt{-23}$

What is a Complex Number?

19) A number with both a _____ part and an _____ part written in the form of _____.

Identify the real part and the imaginary part of the following.

20) $6 + 5i$

21) $8 - 3i$

22) $-4 - 7i$

23) $-1 + 13i$

Adding and Subtracting Complex Numbers

24) We add and subtract Complex Numbers just like we do Polynomials, which we did in Day 3 Notes.

Add or Subtract the following Complex Numbers.

25) $(-3 - 9i) + (11 - 7i)$

26) $(4 + i) + (-6 + 2i)$

27) $(-1 - 3i) + (3 - 6i)$

28) $(1 + 2i) - (-5 - 12i)$

29) $(-11 + 4i) - (-10 + i)$

30) $(6 - 11i) - (11 - 6i)$

Multiplying Complex Numbers

31) We multiply Complex Numbers like we multiply Polynomials.

The only difference will be the term with the i^2 . REMEMBER $i^2 = -1$.

Multiply the following Complex Numbers.

32) $(-7 + 2i)(-7 - 4i)$

33) $(6 + 8i)(-6 - 2i)$

34) $(-6 + 5i)^2$

35) $(4 - i)(1 - 3i)$

36) $3(-8i)(2 - 7i)$

37) $(i)(-6i)(7 - 2i)$

38) $(-7 - 8i)(3 - 6i) - 7(8i)(6 - 7i)$

39) $(-1 + 2i) + (6 - i) + (4 + 4i)(8 + i)$