

Name: _____ Date: _____ Unit 5 Class Work

Introduction to Complex Numbers Class Work

Objective: You will be able to simplify expressions using the complex number system, and operate within the complex number system.

Remember the real number system... what do you know about $\sqrt{-1}$?!

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

$i^2 = (\sqrt{-1})^2$
 $i^2 = -1$

★ We use the letter *i* to represent this.

ps i rest

Practice: Simplify each expression.

1. $\sqrt{-27}$
 $= \sqrt{9 \cdot 3 \cdot i^2}$
 $= 3i\sqrt{3}$

2. $\sqrt{-12} + 2$
 $\sqrt{4 \cdot 3 \cdot i^2} + 2$
 $2i\sqrt{3} + 2$
 imag. real

3. $5 + \sqrt{-60}$
 $5 + \sqrt{4 \cdot 3 \cdot 5 \cdot i^2}$
 $5 + 2i\sqrt{15}$
 real imag

$i = i$
 $i^2 = -1$
 $i^3 = i^2 \cdot i = -1 \cdot i = -i$
 $i^4 = i^2 \cdot i^2 = -1 \cdot -1 = 1$

Practice: Simplify each expression.

4. i^7
 $i^2(i^2)^3 \cdot i$
 $(-1)^3 \cdot i^2 = 1 \cdot i = i$

5. i^{21}
 $(i^4)^5 \cdot i$
 $1 \cdot i = i$

6. i^{33}
 $(i^4)^8 \cdot i$
 $1 \cdot i = i$

7. i^{20}
 $(i^4)^5 = 1$

8. i^{21}
 $(i^4)^5 \cdot i = i$

9. i^{20}
 $(i^4)^5 = 1$

★ Standard Form for Complex Numbers:

$a + bi$
 where a and b are real numbers

Practice: Write each expression in standard form. Then identify the real portion and the imaginary portion.

10. $4i + 5 - (3i - 2)$
 $4i + 5 - 3i + 2$
 $7 + i$
 real: 7
 imag: i

11. $9 - (7i + 4)$
 $9 - 7i - 4$
 $5 - 7i$
 real: 5
 im.: -7i

12. $(15i + 3) + (2 - \sqrt{-9})$
 $15i + 3 + 2 - 3i$
 $5 + 2i$
 real: 5
 imag: 2i

13. $\sqrt{-25} + 4i + \sqrt{-1}$
 $5i + 4i + (-1 - i)$
 $5i + 4i - 1 - i$
 $-1 + 8i$
 real imag.

14. $6i + 9 - (6i + 3)$
 $6i + 9 - 6i - 3$
 $6 + 0i$
 real: 6
 imag: 0i

15. $4i + 5 - \sqrt{-24} - 7$
 $\sqrt{4 \cdot 3 \cdot 2 \cdot i^2}$
 $4i + 5 - 2i\sqrt{6} - 7$
 $-2 + 4i - 2i\sqrt{6}$
 real: -2
 imag: $4i - 2i\sqrt{6}$

On blank page:

~ 2 important reminders
(quiz soon)

~ 1 question you have OR
create your own question

Jan 5-8:55 AM

Name: _____ Date: _____ Unit 5 Class Work

- * Create any expression that simplifies to $4i$.
- * Create any expression that simplifies to $-i$.
- * Create any expression that simplifies to $2 - 2i$.

Write a "tweet" for which the hashtag #WhatIKnowAboutComplexNumbers would be appropriate. Post it on the board, and then "star" your favorite! ☺