Unit 1: Quadratics Revisited

I can simplify, add and subtract complex numbers, including simplifying radicals with imaginary roots.

Today's Agenda:

1. Notes on simplifying, adding, and subtracting complex radicals and expressions.

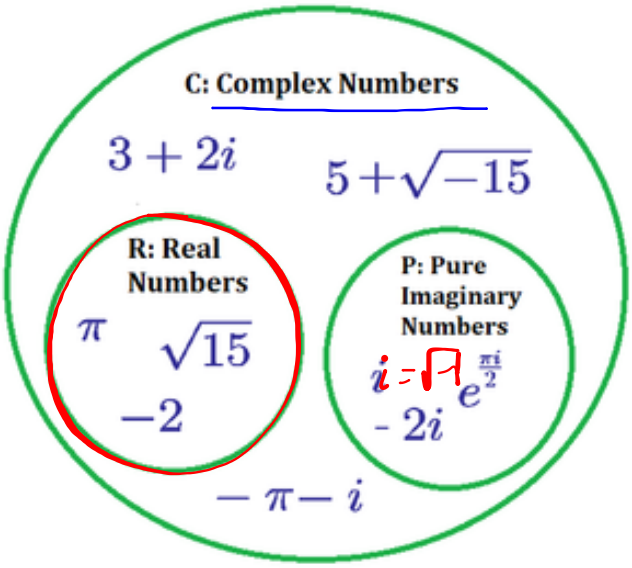
   p. 1

2. Practice

   p. 3, #1 - 10

   p. 4

$\sqrt{-\#}$ does not exist in set of Real numbers



a + bi

real part

imaginary part

"back #"

Algebra 2 Unit 1

Name: _____ Date: _____

Complex Numbers

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

Examples:

1. $\sqrt{-16}$ $\sqrt{-1 \cdot 4}$ $\boxed{2i}$
2. $\sqrt{-81}$ $\sqrt{-1 \cdot 81}$ $\sqrt{-1} \cdot \sqrt{81}$ $\boxed{9i}$
3. $\sqrt{-45}$ $\sqrt{-1 \cdot 45}$ 5 9 33 $\boxed{3i\sqrt{5}}$
4. $\sqrt{-200}$ $\sqrt{-1 \cdot 200}$ 2 100 $\boxed{10i\sqrt{2}}$

"I one, I one"

Negatives in the middle.

- $i^1 =$ i, remainder = 1 decimal .25
- $i^2 =$ -1, remainder = 2 .5
- $i^3 =$ $-i$, remainder = 3 .75
- $i^4 =$ 1, remainder = 0 1.00

$i^5 = (i^4)(i) = 1i = i$

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

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

$i^3 = (i^2)i = (-1)i = -i$

$i^4 = (i^2)(i^2) = (-1)(-1) = 1$

1 R1: $4\overline{)5}$, -4, 1

Examples:

5. $i^{13} = \boxed{i}$ 3 R1: $4\overline{)13}$, -12, 1
6. $i^{27} = \boxed{-i}$ 6 R3: $4\overline{)27}$, -24, 3; $\frac{27}{4} = 6.75$
7. $i^{54} = \boxed{-1}$ 13 R2: $4\overline{)54}$, -4, 14, -12, 2
8. $i^{72} = \boxed{1}$ 18 R0: $4\overline{)72}$, -4, 32, -32

Add and Subtract Complex Numbers

- Add or subtract the real parts, and then, add or subtract the imaginary parts.

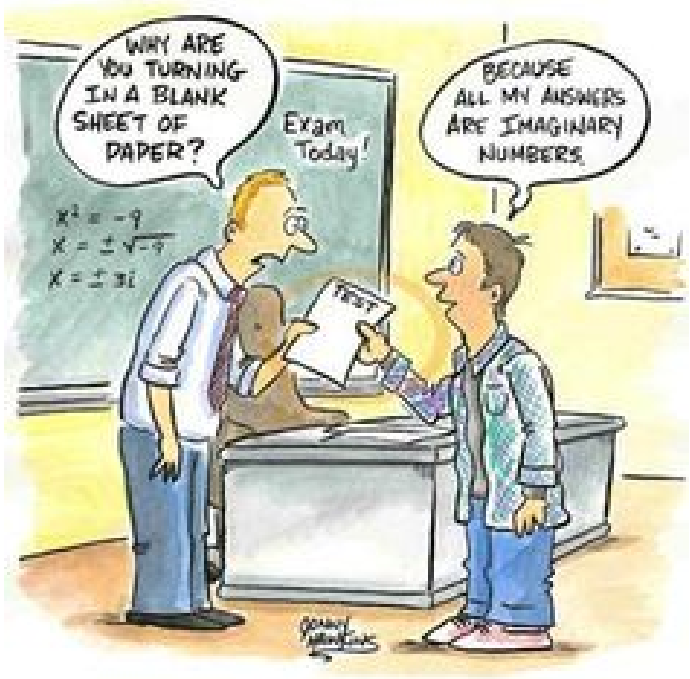
9. $(3+2i)+(7+6i)$ $\boxed{10+8i}$
10. $(6-5i)-(1+2i)$ $6-5i-1-2i$ $\boxed{5-7i}$
11. $(9-4i)-(-2+3i)$ $9-4i+2-3i$ $\boxed{11-7i}$
12. $9-(10+2i)-5i$ $9-10-2i-5i$ $\boxed{-1-7i}$
13. $(11i^4+4i^3)-(2i^4-6i^3)$ $11i^4+4i^3-2i^4+6i^3$ $9i^4+10i^3$ $9(1)+10(-i) = \boxed{9-10i}$

Add / Subtract → ① Distribute (-) and change signs

① combine like terms

② write in standard form

$a + bi$


WHY ARE YOU TURNING IN A BLANK SHEET OF PAPER?
Exam Today!
BECAUSE ALL MY ANSWERS ARE IMAGINARY NUMBERS.
$x^2 = -9$
$x = \pm\sqrt{-9}$
$x = \pm 3i$

Algebra 2 Unit 1

Complex Numbers – Practice

Write each expression in standard form.

1. i^2
2. i^{14}
3. i^7
4. i^{23}

5. $(4-2i)+(3-i)$
6. $(9+i^2)+i^2$
7. $(-2+i)+(-10-14i)$

8. $5-(15+i)-(3-5i)$
9. $7i+(12+2i)+4$
10. $(4i^2)+8i^2$

11. $(-2i)^2(3i)^3$
12. $(5-6i)(7-2i)$
13. $(2+3i)(2-3i)-4+i$

14. $\dfrac{2}{3-i}$
15. $\dfrac{-4i}{3-3i}$
16. $\dfrac{4+2i}{2+4i}$

15. Let r = (4 + i) and s = 1 – i. What is the value of $r^2 - s$?

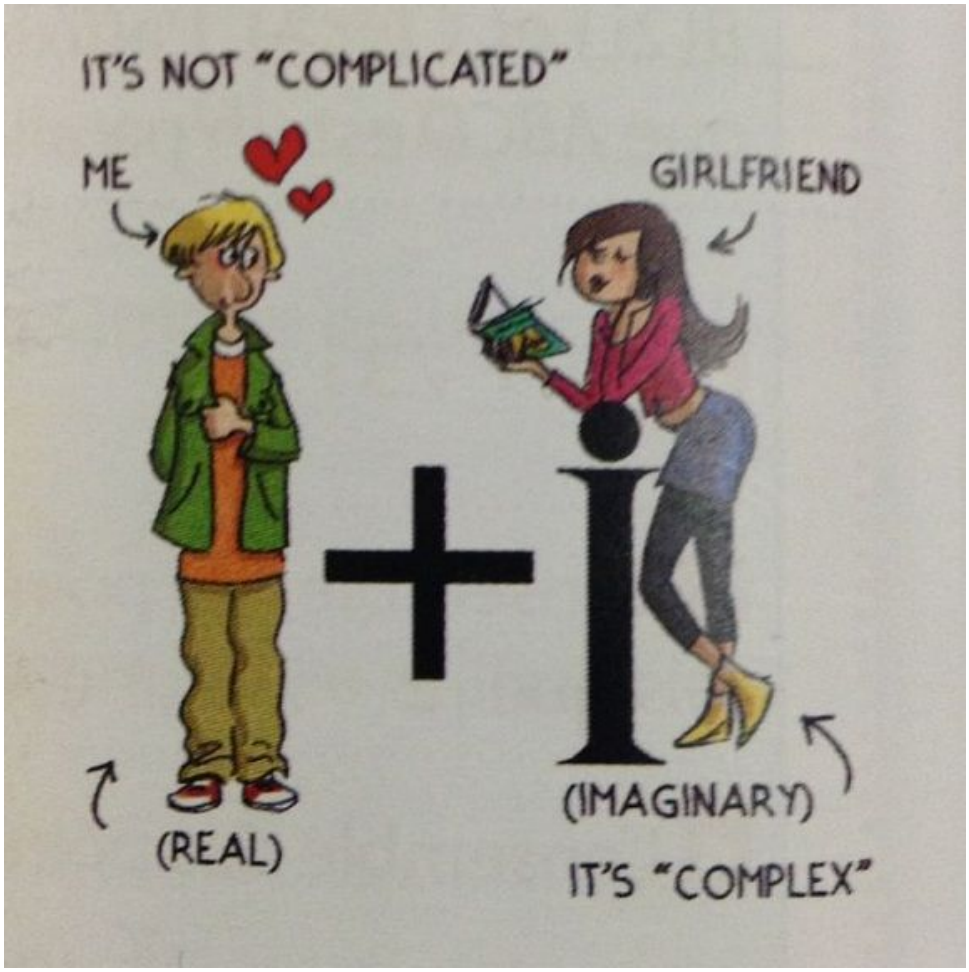
a. 14 + i b. 15 + I c. 15 + 7i d.14 + 9i

Algebra 2 **Simplifying Complex Radicals** **Unit 1**

Name _____ **Date**_____ **Period** _____

Simplify.

1. $\sqrt{-1}$	2. $\sqrt{-4}$
3. $\sqrt{-16}$	4. $\sqrt{-25}$
5. $\sqrt{-50}$	6. $\sqrt{-72}$
7. $\sqrt{-80}$	8. $\sqrt{-98}$
9. $\sqrt{-108}$	10. $\sqrt{-125}$
11. $\sqrt{-96}$	12. $\sqrt{-500}$
13. $\sqrt{-52}$	14. $\sqrt{-147}$


IT'S NOT "COMPLICATED"
ME
GIRLFRIEND
(REAL)
(IMAGINARY)
IT'S "COMPLEX"