

Algebra II
Section 5.9
Operations with Complex Numbers

Bell Ringer

In a mountain bike relay race, Vicki and Rebecka rode less than 18 miles combined. Vicki rode at a slower rate than Rebecka. Rebecka rode for 3 hours and Vicki rode for 2 hours. Which system of inequalities describes the rate d in miles per hour that Rebecka rode and the rate n in miles per hour that Vicki rode?

- A) $2n+3d>18$ B) $2n+3d<18$ C) $2n+3d<18$ D) $2n+3d>18$
 $n>d$ $n>d$ $n<d$ $n<d$

Nov 1-12:17 PM

Nov 1-12:18 PM

$$\begin{aligned} & \overset{18}{\sqrt{-2}(\sqrt{-16} + \sqrt{-8})} \\ & i\sqrt{2}(4i + i\sqrt{8}) \\ & 4(\cancel{i})\sqrt{2} + (\cancel{i})\sqrt{16} \\ & -4\sqrt{2} - 4 \end{aligned}$$

When we look at complex numbers, we have an imaginary number.

It is written as $a + bi$ where a is a real number and bi is an imaginary number.

Today we will simplify complex numbers by adding, subtracting, multiplying, and ~~dividing~~.

Nov 4-9:37 AM

Nov 1-12:25 PM

Add or subtract. Write the result in the form of a+bi.

1. $(4 + 2i) + (-6 - 7i)$
 $-2 - 5i$

2. $(1 - 3i) + (-1 + 3i)$
 0

3. $(5 - 2i) + (2 + 3i)$
 $7 + i$

4. $(7i) + (3 + 5i)$
 $-3 + 12i$

Nov 1-12:31 PM

Multiply. Write the result in the form a+bi.

1. $-2i(2 - 4i)$
 $-4i + 8i^2$
 $-8 - 4i$

2. $(3 + 6i)(4 - i)$
 $12 - 3i + 24i - 6i^2$
 $12 + 21i - 6(-1)$
 $12 + 21i + 6$
 $18 + 21i$

3. $(2 + 9i)(2 - 9i)$
 $4 - 18i + 18i - 81i^2$
 $4 - 81(-1)$
 $4 + 81$
 85

4. $(-5i)(6i)$
 $-30i^2$
 $-30(-1)$
 30

Nov 1-12:34 PM

Simplify (remember $i = \sqrt{-1}$)

1. $-6i^{14}$
 $4 \overline{)14}$
 $\underline{12}$
 $R 2$
 $-6i^2$
 $-6(-1)$
 6

2. i^{63}
 $4 \overline{)63}$
 $\underline{40}$
 $R 23$
 $\underline{20}$
 $R 3$
 $i^3 = \boxed{-i}$

$i = \sqrt{-1}$
 $i^2 = -1$
 $i^3 = -i$
 $i^4 = 1$

Nov 1-12:41 PM

Simplify

1. $\frac{3+10i}{5i}$

2. $\frac{2+8i}{4-2i}$

Nov 1-12:45 PM

Conclusion

1. How is adding/subtracting different with complex numbers?

2. When multiplying, can we leave i^2 ? (-1)

3. How is the answer for complex numbers always written?

4. ?????s

$$\underline{a} + \underline{bi}$$

Assignment**Page 386****12 - 17, 21-26 (no graphing)**

Nov 1-12:47 PM

Nov 1-12:50 PM