Square Roots Review

Definition: The square root of a number is a value, that when multiplied by itself, gives the number.

Ex: 4 x 4 = 16, so the square root of 16 is 4.

The radicand is the symbol we use to represent a square root.

$\sqrt{x}$

Jul 27-2:39 PM

Some radicals are written in what is called simplest form.

For Example...

$\sqrt{21}, \sqrt{3}, \sqrt{10}$

Some radicals can be written using smaller values. This process is called simplifying a radical.

For Example...

$\sqrt{18} = 3\sqrt{2}$

In that problem, the numbers 2 and 3 are both smaller than 18.

How did we do that?

Jul 27-2:46 PM

Simplifying Radicals Using Factor Trees

Let's look at 2 examples of how to simplify a radical...

Ex. 1

$\sqrt{45}$

Ex. 2

$\sqrt{108}$

Jul 27-2:52 PM

Simplifying Radicals With Fractions

Let's look at 2 examples of how to simplify a radical...

Ex. 1

$\sqrt{\frac{5}{16}}$

Ex. 2

$\sqrt{\frac{81}{169}}$

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Name_____

Simplifying Radical Expressions

Date_____ Period____

Simplify.

1) $\sqrt{125n}$

2) $\sqrt{216v}$

3) $\sqrt{512k^2}$

4) $\sqrt{512m^3}$

5) $\sqrt{216k^4}$

6) $\sqrt{100v^3}$

7) $\sqrt{80p^3}$

8) $\sqrt{45p^2}$

9) $\sqrt{147m^3n^3}$

10) $\sqrt{200m^4n}$

11) $\sqrt{75x^2y}$

12) $\sqrt{64m^3n^3}$

13) $\sqrt{16u^4v^3}$

14) $\sqrt{28x^3y^3}$

15) $\sqrt{36x^2y^3}$

16) $\sqrt{384x^4y^3}$

17) $7\sqrt{96m^3}$

18) $6\sqrt{72x^2}$

19) $-6\sqrt{150r}$

20) $5\sqrt{80a^2}$

21) $2\sqrt{125v}$

22) $-8\sqrt{24k^3}$

23) $-4\sqrt{192x}$

24) $2\sqrt{8p^2q^3r}$

25) $-4\sqrt{216x^2y^2z}$

26) $-3\sqrt{24a^4b^2c^3}$

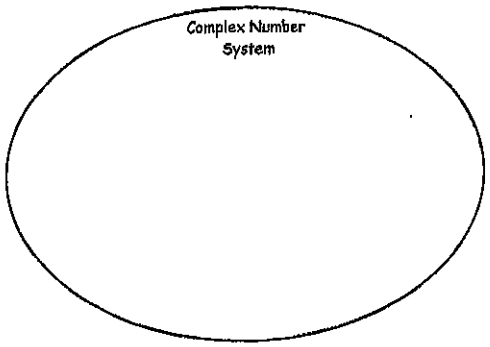
27) $3\sqrt{16x^4y^4z}$

28) $-2\sqrt{48a^3b^4c^2}$

29) $6\sqrt{75mp^2q^3}$

30) $4\sqrt{36x^2y^3z^4}$

Complex Numbers



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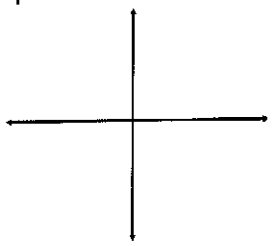
complex number:
(standard form)

Ex.1 Plot each complex number.

a. 2 + 3i
b. -4 + 2i
c. 2 - 4i
d. -3 - i
e. 5
f. -3i



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$i =$

$i^2 =$

$i^3 =$

$i^4 =$

Ex.2 Simplify

a. i^7 b. i^{15} c. i^{54}

Oct 28-10:05 AM

Ex.3 Simplify

a. $\sqrt{-4}$ b. $\sqrt{-25}$

c. $3\sqrt{-16}$ d. $\sqrt{-\frac{a}{9}}$

e. $\sqrt{-18}$ f. $\sqrt{64}+\sqrt{-63}$

g. $-\sqrt{25}+7$

Oct 28-10:11 AM

Solve for x and y:

$3xi + 2y = 12i + 14$

$-2x - 6yi = 16 - 48i$

Jul 28-10:24 AM

LESSON 1.1

Exercise Set A

MM2N1a Write square roots of negative numbers in imaginary form.

MM2N1b Write complex numbers in the form $a + bi$.

Simplify the expression.

1. $\sqrt{500}$
2. $\sqrt{108}$
3. $\sqrt{242}$
4. $\sqrt{128}$
5. $\sqrt{125}$
6. $\sqrt{343}$
7. $\sqrt{\frac{25}{169}}$
8. $\sqrt{\frac{16}{36}}$
9. $\sqrt{\frac{23}{121}}$
10. $\sqrt{\frac{6}{9}}$
11. $\sqrt{\frac{27}{4}}$
12. $\sqrt{\frac{32}{25}}$

Match the complex number with the correct standard form.

13. $10 + \sqrt{-16}$
14. $\sqrt{-16}$
15. $10 - \sqrt{-16}$

A. $4i$

B. $10 + 4i$

C. $10 - 4i$

Write the complex number in standard form.

16. $\sqrt{-4}$
17. $\sqrt{-64}$
18. $\sqrt{-100}$
19. $\sqrt{-32}$
20. $\sqrt{-17}$
21. $\sqrt{-75}$
22. $\sqrt{-45}$
23. $\sqrt{-\frac{108}{49}}$
24. $\sqrt{-\frac{68}{81}}$
25. $3 + \sqrt{-2}$
26. $5 - \sqrt{-21}$
27. $9 + \sqrt{-81}$
28. $-2 + \sqrt{-18}$
29. $-4 - \sqrt{49}$
30. $8 - \sqrt{-48}$
31. $\sqrt{-11} + 6$
32. $-\sqrt{-25} + 12$
33. $\sqrt{144} - 11$

Error Analysis ***Describe*** **and correct the error in writing the complex number in standard form.**

34.
$$\begin{aligned} 5 - \sqrt{-9} &= 5 - (\sqrt{-9}) \\ &= 5 - (-3) \\ &= 5 + 3 \\ &= 8 \end{aligned}$$
X

35.
$$\begin{aligned} 3 + \sqrt{-8} &= 3 + \sqrt{8(-1)} \\ &= 3 + \sqrt{8}\sqrt{-1} \\ &= 3 + 2i\sqrt{2} \\ &= 5i\sqrt{2} \end{aligned}$$
X

Find real numbers x and y to make the equation true.

36. $2x - 4yi = 8 + 12i$
37. $5x + yi = 10 + i$
38. $-3x + 2yi = 15 - 4i$
39. $-2x + 6yi = 14 - 24i$
40. $4x + 3i = 16 - yi$
41. $11 - 5yi = x + 10i$
42. $x + 7yi = -6 + 21i$
43. $-4x - 4yi = 4 + 48i$
44. $22 - 8i = 11x + 4yi$

45. The complex numbers $-2xi + 8$ and $6 + 4yi$ are equal. Find the values of x and y.

Kuta Software - Infinite Algebra 2 Name_____

Operations with Complex Numbers

Date_____ Period____

Simplify.

1) $i + 6i$

2) $3 + 4 + 6i$

3) $3i + i$

4) $-8i - 7i$

5) $-1 - 8i - 4 - i$

6) $7 + i + 4 + 4$

7) $-3 + 6i - (-5 - 3i) - 8i$

8) $3 + 3i + 8 - 2i - 7$

9) $4i(-2 - 8i)$

10) $5i \cdot -i$

11) $5i \cdot i \cdot -2i$

12) $-4i \cdot 5i$

13) $(-2 - i)(4 + i)$

14) $(7 - 6i)(-8 + 3i)$

15) $7i \cdot 3i(-8 - 6i)$

16) $(4 - 5i)(4 + i)$

17) $(2-4i)(-6+4i)$

18) $(-3+2i)(-6-8i)$

19) $(8-6i)(-4-4i)$

20) $(1-7i)^2$

21) $6(-7+6i)(-4+2i)$

22) $(-2-2i)(-4-3i)(7+8i)$

23) $5i+7i\cdot i$

24) $(6i)^3$

25) $6i\cdot -4i+8$

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

27) $(8-3i)^2$

28) $3+7i-3i-4$

29) $-3i\cdot 6i-3(-7+6i)$

30) $-6i(8-6i)(-8-8i)$

Critical thinking questions:

31) How are the following problems different?

Simplify: $(2+x)(3-2x)$
Simplify: $(2+i)(3-2i)$

32) How are the following problems different?

Simplify: $2+x-(3-2x)$
Simplify: $2+i-(3-2i)$

Complex Numbers

$a + bi$

a and b are real numbers

$a + bi$ and $a - bi$ are called *CONJUGATES.*

opposite signs

Oct 28-10:02 AM

Ex.4 Add or Subtract

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

b. $(-1 - 4i) - (3 + 2i)$

c. $(4 + i) + (-2 + 3i) - (-5i)$

d. $10 - (-4 - 2i) - 5$

Oct 28-10:16 AM

Ex.5 Multiply and Simplify

a. $2i(3 - 4i)$

b. $-i(2 + 3i)$

c. $(2 + 6i)(-3 + 2i)$

d. $(5 + 2i)(5 - 2i)$

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Ex 6: Divide

a. $\frac{3+2i}{i}$

b. $\frac{5}{3i}$

Jul 28-10:36 AM

Ex.7 Divide and Simplify

a. $\frac{2 + i}{4 - 5i}$

b. $\frac{5 - 2i}{3 + 3i}$

Oct 28-10:19 AM

Kuta Software - Infinite Algebra 2 Name_____

Rationalizing Imaginary Denominators

Date_____ Period____

Simplify.

#1-18

1) $\frac{2}{8i}$

2) $\frac{3}{5i}$

3) $\frac{-5}{-5i}$

4) $\frac{-1}{-9i}$

5) $\frac{6}{-4i}$

6) $\frac{6+8i}{9i}$

7) $\frac{4-9i}{-6i}$

8) $\frac{-3+10i}{-6i}$

9) $\frac{-1+8i}{-i}$

10) $\frac{10-10i}{-5i}$

11) $\frac{5i}{-2-6i}$

12) $\frac{8i}{-1+3i}$

13) $\frac{1}{-8-5i}$

14) $\frac{i}{-2-8i}$

15) $\frac{4}{-3-6i}$

16) $\frac{-10-5i}{-6+6i}$

17) $\frac{-5-9i}{9+8i}$

18) $\frac{-4+10i}{3+4i}$

19) $\frac{-5-3i}{7-10i}$

20) $\frac{-3-7i}{7+10i}$

21) $\frac{-1+i}{-5i}$

22) $\frac{-6-i}{i}$

23) $\frac{2+5i}{-i}$

24) $\frac{-4-4i}{4i}$

25) $\frac{3}{-i}$

26) $\frac{a}{ib}$

Name : _____ Score : _____

Teacher : _____ Date : _____

Rationalizing Imaginary Denominators

Simplify.

1) $\frac{-8}{7i}$

2) $\frac{-10}{i}$

3) $\frac{2 + i}{-1 - 2i}$

4) $\frac{4 + 6i}{-6 - 7i}$

5) $\frac{1 - i}{-4i}$

6) $\frac{-7 + 4i}{-3 - i}$

7) $\frac{10 - i}{5i}$

8) $\frac{2 + i}{-5 + 2i}$

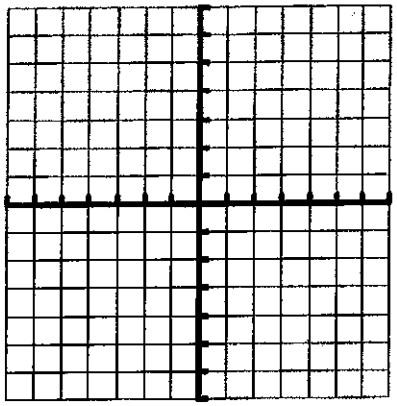
9) $\frac{3 + 5i}{-i}$

10) $\frac{4}{i}$

Quiz Review

Complex Numbers WS Name _____

1. Plot and label each complex number on the complex plane.



A. $2 - 3i$

B. $-4i$

C. $-1 + 5i$

D. $4 + i$

2. Simplify, writing each answer as a complex number in standard form.

a. $\sqrt{-100}$ b. $\sqrt{-24}$ c. $\sqrt{-72}+\sqrt{81}$ d. $\sqrt{-\frac{9}{16}}$

3. Add or subtract, writing each answer as a complex number in standard form.

a. $(2 - 3i) + (-1 - 5i)$ b. $(4 - i) - (-2 + 3i)$ c. $-13 - (25 - 3i) + 25i$

4. Multiply, writing each answer as a complex number in standard form.

a. $-3i(4 - 2i)$ b. $(5 - 2i)(1 + 3i)$ c. $(4 - i)(3 + 2i)(1 + i)$

5. Divide, writing each answer as a complex number in standard form.

a. $\frac{4-3i}{-2i}$

b. $\frac{2+5i}{3-i}$

Not on QUIZ

6. Find real numbers x and y to make each equation true.

a. $2x - 4yi = 8 + 12i$ b. $-4x - 4yi = 48i$ c. $4x - 7i = 22 - 2yi$

TEST for Unit 1

~~ALSO~~, review notes and homework AND QUIZ review sheet

REVIEW

Simplify the expression.

1. $\sqrt{525}$
2. $\sqrt{567}$
3. $\sqrt{192}$
4. $\sqrt{\frac{49}{81}}$
5. $\sqrt{\frac{128}{25}}$
6. $\sqrt{\frac{53}{9}}$

Write the complex number in standard form.

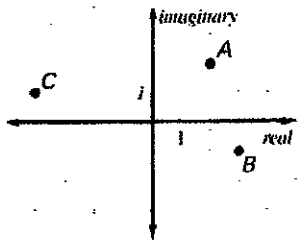
7. $\sqrt{-99}$
8. $\sqrt{-196}$
9. $\sqrt{-80}$
10. $2 + \sqrt{-27}$
11. $6 - \sqrt{-162}$
12. $-3 + \sqrt{-44}$

Write the expression as a complex number in standard form.

13. $6i + (-2 - 7i)$
14. $(1 - 4i) - (1 + 3i)$
15. $(2 + 5i) + (5 - 2i)$
16. $(-7 - 12i) + (4 + 5i)$
17. $(1 - i) - (6 + i)$
18. $(9 - 8i) - (4 - 13i)$
19. $(-2 + 3i) + (2 - 3i)$
20. $(4 - i) - (-6 + 7i)$
21. $6i + (-7 + i) - 2$
22. $7 - (-10 + i) + 4i$
23. $(1 + 3i)(-2 + i)$
24. $(-2 - 5i)(2 - 2i)$
25. $(3 - 2i)7i$
26. $(7 + i)5i$
27. $(-2 + 2i)^2$
28. $(1 - i)(2 - 6i)$
29. $-(2 + 3i)(1 - 4i)$
30. $(3 + 5i)^2$
31. $4i(3 - i)(-2 + 8i)$
32. $-3i(2 - i)(4 - 5i)$
33. $\frac{3i}{4 - i}$
34. $\frac{6 + 2i}{4 + 8i}$
35. $\frac{1 + 2i}{2 - 4i} \times \frac{2 + 4i}{1 - 2i}$

Identify the complex numbers plotted in the complex plane.

37.



38.