

Simplify

1. $\sqrt{98x^3y^5}$ 2. $\sqrt{200a^4b^3c}$

3. $\sqrt[3]{32}$ 4. $\frac{\sqrt[3]{5}}{\sqrt{5}}$ 5. $\frac{\sqrt[3]{24}}{\sqrt[3]{4}}$

$\sqrt[3]{8 \cdot 4}$ $\frac{3\sqrt{5}}{\sqrt{25}}$ $\frac{\sqrt[3]{3} \cdot \sqrt[3]{3} \cdot \sqrt[3]{2}}{\sqrt[3]{4}} = \frac{2\sqrt[3]{3}}{\sqrt[3]{4}}$

$\frac{3\sqrt{5}}{5}$ $\frac{2\sqrt[3]{3}}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}}$

$\frac{2\sqrt[3]{3}}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}}$

$\frac{2\sqrt[3]{48}}{\sqrt[3]{64}} = \frac{\sqrt[3]{48}}{4}$

$\frac{4\sqrt[3]{6}}{4} = \sqrt[3]{6}$

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Complex Numbers

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The Complex Number System

$\sqrt{-4}$
 Imaginary #
 or
 Complex #

$\sqrt{4} = 2 \text{ or } -2$
 b/c $2 \cdot 2$
 $-2 \cdot 2$

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Complex Numbers

- A # in the form of $a+bi$ where a represents a real # and the bi represents the imaginary #
- Imaginary #s are sq. rts. of negative #s

$i = \sqrt{-1}$

$i^2 = ? -1$

$\sqrt{-1 \cdot 4} = 2i$

$\sqrt{-1 \cdot 5} = 2i\sqrt{5}$

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

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

$i^5 = i^4 \cdot i = i$

$i^6 = i^3 \cdot i^3 = -1$

$i^7 = i^3 \cdot i^2 \cdot i = -i$

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Powers of i

- $i = i$
- $i^2 = -1$
- $i^3 = -i$
- $i^4 = 1$
- $i^5 = i$
- $i^6 = -1$
- $i^7 = -i$
- $i^8 = 1$
- $i^9 = i$ etc.

$i^{27} = i^{24} \cdot i^3 = -i$

i^{437}

simplify:

$i^{20} = i^4 \cdot i^4 \cdot i^4 \cdot i^4 \cdot i^4 = 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 1$

$i^{10} = i^3 \cdot i^3 \cdot i^3 \cdot i^4 \cdot i^4 \cdot i = -i \cdot -i \cdot -i \cdot 1 \cdot 1 \cdot i = -i$

$i^{11} = i^2 \cdot -i = -1 \cdot -i = i$

$i^{12} = -1$

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i^{27}

$i^{24} \cdot i^3$

$i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3 \cdot i^3$

$\underbrace{-i \cdot -i}_{i^2} \cdot \underbrace{-i \cdot -i}_{i^2} \cdot \underbrace{-i \cdot -i}_{i^2} \cdot \underbrace{-i \cdot -i}_{i^2} \cdot -i$

$\underbrace{-1 \cdot -1}_1 \cdot \underbrace{-1 \cdot -1}_1 \cdot -i$

$-i$

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$$i^{33}$$

$$i^{32} \cdot i$$

$$1 \cdot i$$

i

$$i^{66}$$

$$i^{64} \cdot i^2$$

$$1 \cdot -1$$

-1

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Operations with Complex #s

- Treat i like a variable
- Same rules as radicals will apply (bc i does represent a radical)
- Don't leave anything above a power of 1 for i

$2i - 10i = -8i$

3-4i
-5+7i
=
-2+3i

7-i

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Multiply and Divide Complex

- Remove the i first

before you multiply

$$\text{ex. } (\sqrt{\cancel{4}}) \cdot \sqrt{\cancel{8}2} \neq \sqrt{32}$$

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

$$\text{ex. } -2i \cdot 6i =$$

$$\text{ex. } (2 + 3i)(4 - i) =$$

$$\text{ex. } (5 + 5i)^2 =$$

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