Friday, October 3, 2014

Evaluate each expression. Express the result in scientific notation.

1. $(3.2 \times 10^6)(2.8 \times 10^2)$

2. $\dfrac{4.4 \times 10^7}{1.6 \times 10^5}$

3. $(1.98 \times 10^4) + (3.06 \times 10^6)$

4. $(2.99 \times 10^{12}) - (7.28 \times 10^9)$

TURN IN YOUR HOMEWORK

Square and Cube Roots

Chapter 1 Lesson 8

Student Objective: Students will find and estimate square roots and cube roots.

Essential Question: When finding square roots of numbers that are not perfect squares, what is the difference between an exact value and an approximation?

Square Roots

A square root of a number is one of its two equal factors.
Numbers like 1, 4, 9, 16, 25, and 144 are perfect squares because they are squares of integers. The opposite of squaring a number is finding the square root.
A radical sign, $\sqrt{}$, is used to indicate a nonnegative square root. Every positive number has both a positive and a negative square root.

$\sqrt{36} = 6$ $-\sqrt{36} = -6$ $\pm\sqrt{36} = \pm 6$, or 6, -6

A negative number like -36 has no real-number square root because the square of a number cannot be negative. *You'll learn about real numbers in one of the next lessons.*

$\sqrt{-36}$ = no real square root

Find each square root.

a. $\sqrt{\frac{9}{16}}$ $\frac{3}{4}$ b. $-\sqrt{64}$ -8 c. $\pm\sqrt{0.09}$ ± 0.3 d. $\sqrt{-81}$ NRSR

e. $\sqrt{\frac{4}{16}}$ $\frac{2}{4}$ f. $-\sqrt{16}$ -4 g. $\pm\sqrt{100}$ ± 10 h. $\sqrt{-49}$ NRSR

Cube Roots

A cube root of a number is one of its three equal factors.

Since 2 x 2 x 2 or $2^3 = 8$, 2 is a cube root of 8.

Since -6 x (-6) x (-6) = -216, -6 is a cube root of -216.

$\sqrt[3]{\ }$ is used to indicate the cube root of a number.

Every integer has exactly one cube root.

- The cube root of a positive number is positive.
- The cube root of zero is zero.
- The cube root of a negative number is negative.

Find each cube root.

a. $\sqrt[3]{343}$ 7

b. $\sqrt[3]{-729}$ -9

4a. $\sqrt[3]{64}$ 4

4b. $\sqrt[3]{-1331}$ -11

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$7, 9, \sqrt{50}, \sqrt{85}$

$7, \sqrt{50}, 9, \sqrt{85}$

	Squared	Cubed
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000
11	121	1331
12	144	1728
13	169	2197
14	196	2744
15	225	3375
16	256	4096
17	289	4913
18	324	5832
19	361	6859
20	400	8000

Estimating Square Roots

You can estimate the square root of an integer that is not a perfect square by determining between which two consecutive integers the square root lies.

Example: Estimate each square root to the nearest integer.

a. $\sqrt{33}$ What is the largest perfect square less than 33? 25

What is the smallest perfect square greater than 33? 6 = 36

$\sqrt{33} \approx 6$

Which perfect square is closest to 33?

121, 144

Check with calculator!

b. $-\sqrt{129}$ -11

49, 64

You try:

1. $\sqrt{60}$ 8

16, 25

2. $-\sqrt{23}$ -5

Estimating Cube Roots

You can estimate cube roots mentally by using perfect cubes.

Estimate $\sqrt[3]{83}$ to the nearest integer. Do not use a calculator.

What's the largest perfect cube less than 83?

What's the smallest perfect cube greater than 83?

64 125

4

1728, 2197

5a. $\sqrt[3]{72}$ 64, 125

4

5b. $\sqrt[3]{-2024}$

-13