Slide 1

Perfect Squares, Perfect Cubes and Their Roots

Lesson 3

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Slide 2

Connect

DEFINITIONS:

Area $= 25m^2$

Perfect Square

A number that is a product of some integer with itself.

Examples of Perfect Squares:

4	64	196
9	81	225
16	100	
25	121	
36	144	
49	169	

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Slide 3

Connect

DEFINITIONS:

Square Root

The square root of a number, n denoted $\sqrt{n}$, is a positive number whose square is n.

Examples of Square Roots:

$\sqrt{4} = 2$ $\sqrt{36} = 6$ $\sqrt{100} = 10$ $\sqrt{196} = 14$

$\sqrt{9} = 3$ $\sqrt{49} = 7$ $\sqrt{121} = 11$ $\sqrt{225} = 15$

$\sqrt{16} = 4$ $\sqrt{64} = 8$ $\sqrt{144} = 12$

$\sqrt{25} = 5$ $\sqrt{81} = 9$ $\sqrt{169} = 13$

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Slide 4

Connect

EXAMPLE 1:

Determine the square root of 676

Use prime factorization to help find the prime numbers.

$$676$$
$$2 \cdot 338$$
$$2 \cdot 2 \cdot 169$$
$$2 \cdot 2 \cdot 13 \cdot 13$$
$$(2 \cdot 13)(2 \cdot 13)$$
$$26 \cdot 26$$
$$\boxed{\sqrt{676} = 26}$$

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YOU TRY!

Determine the square root of 1296

Use prime factorization to help find the prime numbers.

1296
2 · 648
2 · 2 · 324
2 · 2 · 2 · 162
2 · 2 · 2 · 2 · 81
2 · 2 · 2 · 2 · 9 · 9
2 · 2 · 2 · 2 · 3 · 3 · 3 · 3
(2 · 2 · 3 · 3)(2 · 2 · 3 · 3)
$\sqrt{1296} = 36$

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YOU TRY!

Determine the square root of 1764

Use prime factorization to help find the prime numbers.

1764
2 · 882
2 · 2 · 441
2 · 2 · 3 · 147
2 · 2 · 3 · 7 · 21
2 · 2 · 3 · 7 · 3 · 7
(2 · 3 · 7)(2 · 3 · 7)
$\sqrt{1764} = 42$

3)441
14 7
3
14
12
21

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DEFINITIONS:

Perfect Cube
  A number times itself twice is a perfect cube.

Examples of Perfect Cubes:

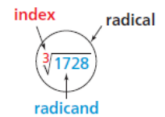|		
8	512	2744
27	729	3375
64	1000	
125	1331	
216	1728	
343	2197	

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DEFINITIONS:

Cube Root
  A number n, denoted $\sqrt[3]{n}$, is a number whose cube is n.

Examples of Cube Roots:

index   radical
$\sqrt[3]{1728}$
radicand

$\sqrt[3]{8} = 2$ $\sqrt[3]{343} = 7$
$\sqrt[3]{27} = 3$ $\sqrt[3]{512} = 8$
$\sqrt[3]{64} = 4$ $\sqrt[3]{729} = 9$ $\sqrt[3]{1728} = 12$
$\sqrt[3]{125} = 5$ $\sqrt[3]{1000} = 10$ $\sqrt[3]{2197} = 13$
$\sqrt[3]{216} = 6$ $\sqrt[3]{1331} = 11$ $\sqrt[3]{2744} = 14$
                                               $\sqrt[3]{3375} = 15$

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EXAMPLE 2:

Determine the cube root of 125

Use prime factorization to help find the prime numbers.

125
5 · 25
5 · 5 · 5

$\sqrt[3]{125} = 5$

EXAMPLE 3:

Determine the cube root of 1728

Use prime factorization to help find the prime numbers.

1728
2 · 864
2 · 2 · 432
2 · 2 · 2 · 216
2 · 2 · 2 · 6 · 6 · 6
(2·6)(2·6)(2·6)

$\sqrt[3]{1728} = 12$

2·2·2·216
2·2·2·2·108
2·2·2·2·2·54
2·2·2·2·2·3·18

YOU TRY!

Determine the cube root of 2744

Use prime factorization to help find the prime numbers.

2744
2 · 1392
2 · 2 · 686
2 · 2 · 2 · 343
2 · 2 · 2 · 7 · 7 · 7
(2·7)(2·7)(2·7)

$\sqrt[3]{2744} = 14$

HOMEWORK!

Textbook Questions:

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