11-20-18

Aim: SWBAT find the square root or cube root of a number.

HW: Packet Page 4

Quiz next week

Do Now: Packet Page 1

AIM: SWBAT find the square root or cube root of a number.

DO NOW:

1) State the first five Counting Numbers 1, 2, 3, 4, 5.

2) Whole Numbers are all the counting #'s and zero.

3) Integers are all the whole #'s and their opposites.

4) Rational are numbers that CAN be written as a fraction. Those would be terminating decimals and repeating decimals.

5) Give an example of a number that CANNOT be written as a fraction. 5.238419...

CLASSWORK:

Irrational are numbers that CANNOT be written as a fraction. Those are non-terminating, non-repeating decimals.

Square – an operation – a number raised to the second power. A number times itself.

* Ex: 4^2 = 16 $(-4)^2$ = 16 -4^2 = -16

Perfect Squares – A number that is the square of an integer.

*****MEMORIZE THE FIRST 15 PERFECT SQUARES!*****

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

$14 \cdot 14$ $14(10+4)$ $140+56$ 196 $\begin{array}{r} 14 \\ \times 14 \end{array}$

Square Root – the opposite (inverse) of squaring a number.

$\sqrt{\ }$ – radical sign

$\sqrt{\ }$ "principal root" positive root

$-\sqrt{\ }$ negative root

$\pm\sqrt{\ }$ Both the positive and negative roots

* $\sqrt{4} = 2$ $-\sqrt{4} = -2$ $\pm\sqrt{4} = \pm 2$

$\sqrt{-4}$ = cannot happen $2i$

The number under the radical sign is called the "radicand"

$\sqrt{4}$ 4 is the radicand

$\sqrt{4}$ The principal or (positive) square root of 4 is 2

$-\sqrt{4}$ The negative root of 4 is -2

$\pm\sqrt{4}$ Both roots of 4 are 2 and -2.

$\sqrt{4}$

$\sqrt{2^2}$

2

The square root of a **perfect square** is a **RATIONAL Number**.

The square root of a **non-perfect square** is an **IRRATIONAL Number**.

Find the SQUARE ROOT of each number.

1) $\sqrt{196}$ = 14

2) $\pm\sqrt{64}$ = ± 8

3) $-\sqrt{100}$ = -10

4) $\sqrt{100}$ = 10

5) $\pm\sqrt{121}$ = ± 11

6) $-\sqrt{144}$ = -12

7) $\sqrt{\frac{4}{9}}$ = $\frac{2}{3}$ $\sqrt{(\frac{4}{9})}$ $\frac{\sqrt{4}}{\sqrt{9}}$

8) $-\sqrt{\frac{169}{225}}$ = $-\frac{13}{15}$ $\frac{\sqrt{169}}{\sqrt{225}}$

9) $\sqrt{25}$ = 5

SQUARE each number.

10) 8 = 64 8^2

11) 4 = 16 4^2

12) -5 = 25 $(-5)^2$

Cube – an operation – a number raised to the third power.

Perfect Cubes – A number that is the cube of an integer.

Cube Roots – the opposite (inverse) of cubing a number.

List the first 10 PERFECT CUBES.

1, 8, 27, 64, 125, 216, 343, 512, 729, 1000

The cube root of a **perfect cube** is a **RATIONAL Number**.

The cube root of a **non-perfect cube** is an **IRRATIONAL Number**.

Evaluate.

1) $\sqrt[3]{1000}$ = 10

2) $\sqrt[3]{-216}$ = -6

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

4) $\sqrt[3]{729}$ = 9

5) $\sqrt[3]{-512}$ = -8

6) $\sqrt[3]{-343}$ = -7

7) $\sqrt[3]{64}$ = 4

8) $\sqrt[3]{8}$ = 2

Decide if each number is RATIONAL or IRRATIONAL.

9) $\sqrt{100}$ Rational

10) $\sqrt{10}$ Irrational

11) $-\sqrt{81}$ Rational

Rational Irrational

12) $\sqrt{6}$ Irrational

13) $\sqrt[3]{8}$ Rational

14) $\sqrt[3]{18}$ Irrational

15) $\sqrt[3]{-1}$ Rational

16) Why is it ok to have a negative number under the radical sign in a cube root, but not in a square root?

You cannot have a negative under a radical sign because the radicand is the result of a number times itself. There is no number times itself that makes a negative because same sign multiplication always yields a positive.

You can have a negative under a cube root sign because the radicand is the result of a number times itself times itself. Three negatives always multiply to make a negative.

HOMEWORK – SQUARES/PERFECT SQUARES & CUBES/PERFECT CUBES

List the first 15 PERFECT SQUARES.

_____, _____, _____, _____, _____, _____, _____, _____,

_____, _____, _____, _____, _____, _____, _____

List the first 10 PERFECT CUBES.

_____, _____, _____, _____, _____, _____, _____, _____,

_____, _____,

Evaluate.

1) $\sqrt{36}$ = _____ 2) $-\sqrt{196}$ = _____ 3) $\pm\sqrt{225}$ = _____ 4) $-\sqrt{4}$ = _____

5) $\sqrt[3]{343}$ = _____ 6) $\sqrt[3]{-125}$ = _____ 7) $\sqrt[3]{216}$ = _____ 8) $\sqrt[3]{-27}$ = _____

SQUARE each number.

9) 7 _____ 10) −5 _____ 11) 8 _____ 12) 15 _____

CUBE each number.

13) 7 _____ 14) −5 _____ 15) 8 _____ 16) −10 _____

17) _____are numbers that CAN be written as a fraction. This would include _____ decimals and _____ decimals.

18) _____are numbers that CANNOT be written as a fraction. This would include _____ and _____ decimals.

Decide if each number is RATIONAL or IRRATIONAL.

19) $\sqrt{144}$ _____ 20) $\sqrt[3]{1000}$ _____

21) $\sqrt{200}$ _____ 22) $-\sqrt{1}$ _____

23) $\sqrt{12}$ _____ 24) $\sqrt[3]{15}$ _____

25) $\sqrt[3]{-27}$ _____ 26) $\sqrt{400}$ _____