ROOTS and what kind they can be….

-They can be ■ (square) $\sqrt{}$

- They can be ⬡ (cube) $\sqrt[3]{}$

- They can be any degree $\sqrt[n]{}$

- They can produce a non-real number, i.e. imaginary number $\sqrt{-1} = \sqrt[2]{-1} = i$. Imaginary numbers represent the phase. Consider a number to be a combination of (x, y) values on the graph

https://www.youtube.com/watch?v=QFi16s4RXXY

Taking a root of number is the revers operation to taking a power of a number. For simplicity we will focus on square roots operations at the moment.

$$\sqrt{a^2} = a$$

Some tricky examples:

$$\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2} = \sqrt{2^2} \cdot \sqrt{8} = 2 \cdot \sqrt{2}$$

$$\sqrt{a^8} = \sqrt{(a^4)^2} = a^4$$

$$\sqrt{a^7} = \sqrt{a^6 \cdot a} = \sqrt{(a^3)^2}\sqrt{a} = a^3 \cdot \sqrt{a}$$

MATH5 HOMEWORK 19

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1. Compute using operations with powers.

(a) $2^{-3} =$ (b) $\dfrac{2^2 3^8}{2^5 3^3} =$ (c) $(2^3)^2 6^2 3^{-3} =$ (d) $\dfrac{2^8 3^{-14}}{6^{-3}} =$

2. Simplify using operations with powers

(a) $\dfrac{a^3 b^3}{(ab)^2} =$ (b) $a^7 b^5 a^{11} (ab)^3 =$

3. Find the following square roots. If you cannot find the number exactly, at least say between which two whole numbers the answer is, e.g., between 5 and 6.
    a. $\sqrt{16}$
    b. $\sqrt{81}$
    c. $\sqrt{10{,}000}$
    d. $\sqrt{10^8}$
    e. $\sqrt{50}$

4. A street vendor sells two types of magazines, one for 25 cents and the other for 40 cents. If she sold 100 magazines for $28.60, how many of them were 25-cent magazines?

5. A student noticed that if he takes a 2-digit number such as 82, writes the digits in opposite order, and subtracts from the original number, then the result will be divisible by 9: 82 − 28 = 54 = 9 × 6. Is it always so? Will it work for 3-digit numbers as well? [*Hint: denote $d_1\, d_2\, d_3$ the digits, write expression for the number, and then what is the difference, look at the result, think*]

6. *Assume you are given 3 segments as below. Construct a triangle with sides: a, b,c.

    ——————————————————— a+b = 7

    ———————————————— b+c = 9

    —————————————————— a+c = 8

Hint: Ask yourself: "Do I know how to construct a triangle with 3 given sides?" " Ok, how I can reduce the problem given to the one I already know how to solve?"