


## MATH5 CLASSWORK 19

March, 22 2020



### ROOTS and what kind they can be....

- They can be ■ (square) –  $\sqrt{\quad}$
- They can be  (cube) –  $\sqrt[3]{\quad}$
- They can be any degree –  $\sqrt[n]{\quad}$
- They can produce a non-real number, i.e. imaginary number  $\sqrt{-1} = \sqrt[2]{-1} = i$ . Imaginary numbers represent the phase.

<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:

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

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

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

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1. Compute using operations with powers.

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

2. Simplify using operations with powers

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

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:  $82 - 28 = 54 = 9 \times 6$ . 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.

$$\text{_____} \quad a+b = 7$$

$$\text{_____} \quad b+c = 9$$

$$\text{_____} \quad a+c = 8$$

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?"