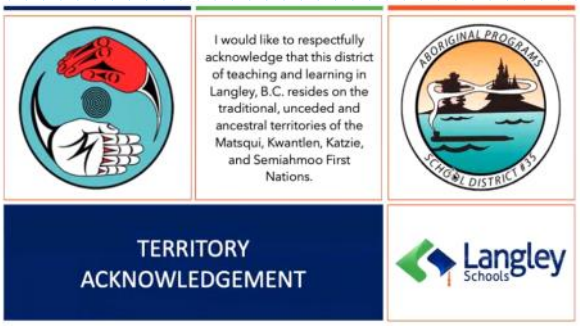
Class_01 Jan 5 - Radicals, Number System

Wednesday, January 4, 2023 5:32 PM

Welcome to PreCalculus 11 Winter 2023

- **Tuesdays & Thursdays, 6:30-9:30 p.m.**
- **January 5 – April 27**
- **Meets in Portable 26**
- **Instructor: Susana Egolf**



As we work together for student success through LEARNING, ENGAGEMENT, and CONNECTION to inspire all learners (including ourselves) to reach their full potential and create a positive legacy for the future, we do so on the traditional, unceded territory of the Matsqui, Kwantlen, Katzie, and Semiamhoo first nations

Tonight's Class:

- **Getting Started – course outline, student info sheet, website**
- **Radicals – square roots and cube roots (1.1)**
- **Real Number System (1.2)**
- **Work on practice questions from worktext**

Do you need a worktext, or need to see the office for something else?

Regular Office Hours:

Mon/Tue/Th	9:30am-4:30pm
Wed	11:30am-6:30pm
Fri	9:30am-2:30pm (closed 12:00-1:00pm)

- **This Friday, January 6, office hours are different: 9:30-1:30 pm**

Course Outline

Class website
https://egolfmath.weebly.com/

LEC CODE OF CONDUCT

PURPOSE, EXPECTATIONS AND CONSEQUENCES
The conduct of students at LEC should at all times contribute to a safe, orderly and positive learning environment. Each student is expected to respect the rights and property of others and to behave appropriately at school, while going to/from school, and while taking part in any school-related function at any location. Unacceptable behaviour includes, but is not limited to, conduct described in the following paragraphs.

Bullying and fighting are inappropriate behaviours in any educational setting. It is our expectation that students are here to learn in a safe and cooperative environment. Our counsellor is available to assist students with personal and inter-personal problems at school.

Weapons and other potentially dangerous devices or materials such as laser pointers, fireworks and explosives are strictly prohibited on or around the school premises and at any school function.

Students may not be under the influence of or have in their possession any prohibited substances, controlled substances such as alcohol or any potentially dangerous drugs as defined by provincial and federal law.

The severity and frequency of unacceptable conduct as well as a student's age and maturity are all considered in determining corrective or restorative action. The consequence for failure to abide by the above expectations may be suspension or expulsion from courses at our school. In some circumstances, it may be necessary for school officials to advise other parties of serious breaches of LEC's Code of Conduct.

CELL PHONES DURING CLASS TIME
Talking or texting on a cell phone, or receiving an audible pager signal, can be disruptive; therefore, cell phones and pagers are to be **turned off in the classroom**. In an emergency, the school's main office can be contacted at 604-534-7155. If the office is closed and if a special circumstance applies, a student can make prior arrangements with the teacher for the appropriate use of a cell phone or pager during class time. Students with cell phones capable of recording and/or taking pictures may be required to hand them in before beginning tests and exams or at a teacher's request.

DRESS CODE
Like all public schools, LEC recognizes that personal taste in clothing varies widely from one student to the next. We allow for individual differences, but we ask our students to show their respect for this school and for other students by choosing clothing which is appropriate for the school setting. Clothing which advertises alcohol or drugs is inappropriate. Equally unacceptable is clothing which pictures foul/profane language or sexually graphic/exploitive situations. Students whose clothing is inappropriate for school will be invited to join us in finding a reasonable solution.

PARKING
Students who want to park their vehicle at LEC's location (paved area east of LSS) will need to purchase a $10.00 yearly parking tag at the main office. In order to identify yourself as an LEC student, please display your tag on the car's rearview mirror. **Note: parking stalls marked "STAFF" are reserved for LEC staff.**

SMOKING
Smoking or using any tobacco product on school property is prohibited by law in BC. According to the Tobacco Control Act, "…a person must not smoke or use tobacco, or hold… tobacco, in or on school property." LEC is a health-promoting school, and we value our tobacco-free environment. If you have not yet made the decision to quit smoking, you are expected to be ***completely off school district property*** before lighting a cigarette or using a tobacco product. School district property at this location includes all land and buildings within the area bordered by 56th Avenue, 216th Street, 57A Avenue and 213A Street.

LEC Code of Conduct.doc

And, if you have time…

Without using a calculator, create two lists of numbers:

- **Perfect squares**
- **Perfect cubes**

1.1 Square Roots and Cube Roots of Fractions

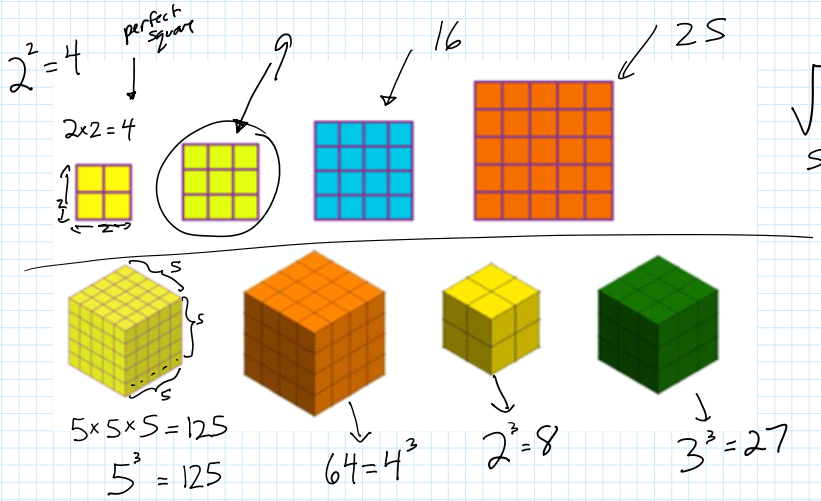
Focus: explore square roots and cube roots of fractions

$3^2 = 9$

we know that $\sqrt{9} = 3$

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

we know that $2^3 = 8$



$\sqrt{100}$

square root of 100 = 10

$\sqrt[n]{a}$

$5\sqrt[3]{18}$

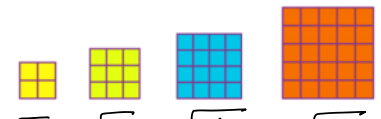
$6\sqrt[5]{14}$

radicand = 14
index = 5
coefficient = 6

Square Roots

The **square root** of a number is,

a number that when we raise it to the 2nd power, produces the radicand



$\sqrt{4} = 2$ $\sqrt{9} = 3$ $\sqrt{16} = 4$ $\sqrt{25} = 5$

we raise it to the 2nd power, produces the radicand

$\sqrt{4} = 2$ $\sqrt{9} = 3$ $\sqrt{16} = 4$ $\sqrt{25} = 5$

$\sqrt{-4}$ = undefined (imaginary number)

$-2 \times -2 = +4$

$\sqrt[3]{-8} = \sqrt[3]{-2 \times -2 \times -2} = -2$

Cube roots of negative numbers are negative

Cube Roots

The **cube root** a number is, a number that when we raise it to the 3rd power, produces the radicand.

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

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

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

$\sqrt[3]{27} = 3$

Roots of negative numbers*

Even roots: Negative numbers have no even roots. (undefined)

Odd Roots: Negative numbers have negative roots.

$$\sqrt{-4} = undefined$$

$$\sqrt[3]{-27} = -3$$

when this is odd, you can get an answer. It will be negative.

$$\sqrt{x^2} = |x|$$

$\sqrt{1} = 1$
$\sqrt{4} = 2$
$\sqrt{9} = 3$
$\sqrt{16} = 4$
$\sqrt{25} = 5$
$\sqrt{36} = 6$
$\sqrt{49} = 7$
$\sqrt{64} = 8$

$\sqrt{81} = 9$
$\sqrt{100} = 10$
$\sqrt{121} = 11$
$\sqrt{144} = 12$
$\sqrt{169} = 13$
$\sqrt{196} = 14$
$\sqrt{225} = 15$

$\sqrt[3]{1} = 1$
$\sqrt[3]{8} = 2$
$\sqrt[3]{27} = 3$
$\sqrt[3]{64} = 4$
$\sqrt[3]{125} = 5$

$\sqrt[3]{216} = 6$
$\sqrt[3]{343} = 7$
$\sqrt[3]{512} = 8$
$\sqrt[3]{729} = 9$
$\sqrt[3]{1000} = 10$

Work Text (WT), page 4

Example 1 Estimating the Value of Square Roots and Cube Roots

Estimate the value of each radical to 1 decimal place. Verify each estimate.

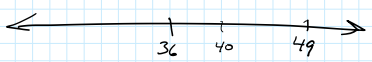
a) $\sqrt{40}$ **b)** $\sqrt[3]{40}$

$\sqrt{36} - \sqrt{40} - \sqrt{49}$

$6 \qquad\qquad 7$

(6.3)

$(6.3)^2 = 39.69$



$\sqrt{40} = 6.32455532\ldots$

$\doteq 6.3$

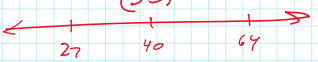
(approximately equal)

$\sqrt[3]{27} \qquad \sqrt[3]{40} \qquad \sqrt[3]{64}$

$3 \qquad = 3.2 \qquad 4$

$(3.2)^3 = 32.77$

$(3.3)^3 =$



$(3.4)^3 = 39.30$

Division Property

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

WT, page 5

Example 2 Determining the Square Root and Cube Root of a Fraction

Evaluate each radical. Write each answer as a fraction in lowest terms.

a) $\sqrt{\frac{72}{98}}$ **b)** $\sqrt[3]{\frac{64}{125}} = \frac{\sqrt[3]{64}}{\sqrt[3]{125}} = \frac{4}{5}$

Division Property $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

$= \sqrt{\frac{72}{98}}$ ÷2 ÷2

try to reduce the fraction

$= \sqrt{\frac{36}{49}} = \frac{\sqrt{36}}{\sqrt{49}}$

$= \frac{6}{7}$

Worktext Practice
page 6: #5-9, 11, 12

WB Pre-Activity

Sort the numbers – mark an "X" in the box for each category the number belongs to.

	Number	Natural Numbers	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
1.	37	✓	✓	✓	✓		✓
2.	$-\sqrt{11}$					✓	✓
3.	$4.7\overline{2}$ $=4.7222222...$				✓		✓
4.	$\frac{26}{13} = 2$	✓	✓	✓	✓		✓
5.	2.71771777177771...					✓	✓

$\sqrt{-9}$ → not a real number

1.2 The Real Number System

Focus: understand the connections within the real number system

natural numbers: 1, 2, 3, 4, ...

whole numbers: 0, 1, 2, 3, 4, ...

"hole" or a donut

integers: ... -4, -3, -2, -1, 0, 1, 2, 3, 4, ...

rational numbers: ... -4, -3, -2, -1, 0, 1, 2, ...

"ratio"

$2.9 = 2\frac{9}{10} = \frac{29}{10}$ and $\frac{2}{3}$ $\frac{4}{-7}$ $\frac{115}{81}$

All decimals that terminate (stop) are rational AND All decimals that have an exact repeating section are rational

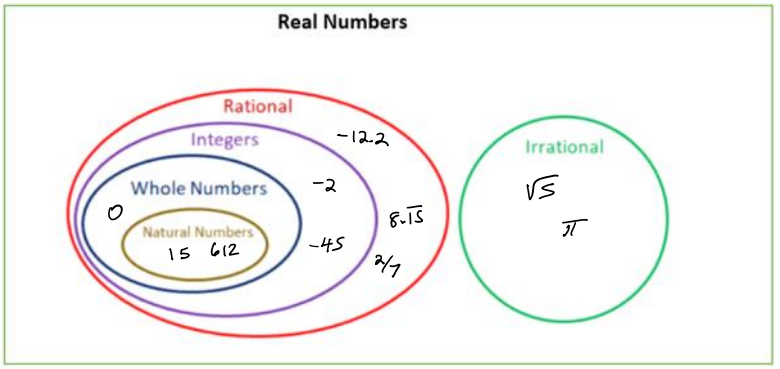
$5.4\overline{27} = 5.427272727...$

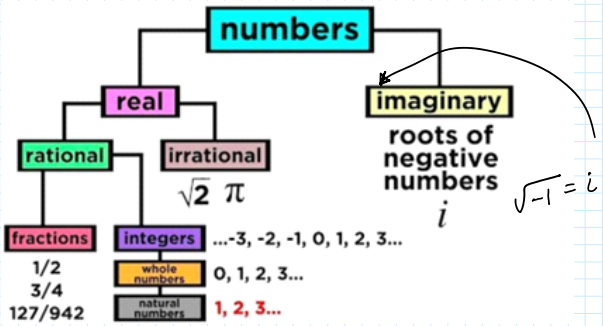
irrational numbers: numbers that cannot be written as a fraction, where each part of the fraction is an integer.

for example: π 3.14.....

$\sqrt{7}$ = about 2.6 (estimate) 2.645751311

$\sqrt{4} = 2$ $\sqrt{9} = 3$





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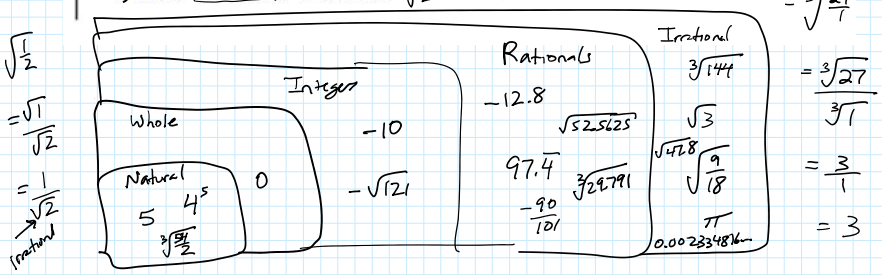
Example 1 Classifying Numbers

Classify each number:

$0, 5, \sqrt{3}, -12.8, 97.4, \pi, -\frac{90}{101}, \sqrt[3]{144}, -\sqrt{121}$

$0.002334816254\ldots, -10, \sqrt{\frac{9}{18}}, 4^5, \sqrt[3]{\frac{54}{2}}, \sqrt{52.5625}$

$\sqrt{47.8}, \sqrt[3]{29.791}, \sqrt[3]{55.006}$



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Check Your Understanding

1. Classify each number:

$12, \sqrt{8}, -9.12, 24.\overline{35}, -13, \sqrt[3]{36}, 2.718\,281\,828\,459\ldots, -\frac{50}{53}, -\sqrt{90}, \sqrt{\frac{9}{12}}, 5^4, \sqrt[3]{\frac{2}{54}}, \sqrt{10.5625}, \sqrt[4]{53.1441}$

For next class

- **Finish worktext questions 1.1-1.2**
- **If you want…. Try explaining ONE thing from tonight's class to somebody who isn't in this class. :)**
- **Complete the "Recap" from tonight!**
- **Try to learn**
  - **perfect squares for 1-15**
  - **perfect cubes for 1-10**