Activity for 1.1 - Logically sort the following numbers into 6 different groups. Each group may contain only 5 numbers. First, use a piece of scrap paper then fill in the notes with the rest of the class.

25.000	0.142857142857…	$\sqrt{81}$	3.125
$30.1\overline{6}$	$\dfrac{5}{7}$	11.732050804…	10
0.828427125…	$\sqrt{25}$	$43.\overline{1}$	$\dfrac{7}{2}$
6.33333333…	307	$\sqrt{16}$	4.5
$7\dfrac{1}{9}$	$\sqrt{26}$	$\sqrt{50}$	$\sqrt{11}$
$\sqrt{36}$	$\dfrac{2}{3}$	$\sqrt{75}$	3.60555127…
9.949874371…	$\sqrt{144}$	$8.\overline{3}$	$\dfrac{21}{10}$
$\sqrt{101}$	7.81024967…		

Group 1	Group 4
Group 2	**Group 5**
Group 3	**Group 6**

1.1 Rational Numbers vs Irrational Numbers

Class Notes - State whether the expression is rational or irrational. Justify your answer.

LP#1 $\frac{7}{9}$	$\sqrt{121}$	4.1111111111…	$\sqrt{12}$	10.05095482…
LP#2 $\frac{41}{20}$	5.25	$25.2\overline{7}$	$7\frac{4}{5}$	$\sqrt{71}$

Review - State whether the expression is rational or irrational. Justify your answer.

| R#1 $\sqrt{4}$	$\frac{9}{11}$	$\sqrt{56}$	$1\frac{8}{9}$	11.375
R#2 8.83876326…	0.6666666666…	$\sqrt{225}$	$3.7\overline{3}$	$\frac{15}{17}$
R#3 10.00004	$\sqrt{31}$	$2\frac{11}{12}$	$\frac{6}{19}$	$5.25\overline{1}$

Homework Problems

State whether the expression is rational or irrational. Justify your answer.

1) 13

2) $\frac{3}{16}$

3) $\sqrt{62}$

4) 5.4059216…

5) $7.\overline{3}$

6) $7\frac{16}{17}$

7) $12.2\overline{6}$

8) $\sqrt{49}$

9) $\frac{16}{29}$

10) 0.2222222…

11) $1\frac{10}{11}$

12) 0.050126…

13) $\frac{1}{14}$

14) $9\frac{18}{19}$

15) 11.161095…

16) $\sqrt{7}$

17) 0.4545…

18) $11.\overline{6}$

19) $\sqrt{100}$

20) $7\frac{16}{21}$

21) 0.909090…

22) 8.85896421…

23) $\frac{4}{11}$

24) $278.2\overline{3}$

25) $6\frac{1}{12}$

26) 12.437698…

27) $0.23\overline{1}$

28) 0.0666666…

29) $\sqrt{3}$

30) $\frac{1}{2}$

Fill in the blanks.

31) $1, \sqrt{2}, \sqrt{3}, 2, \_\_, \sqrt{6}, \sqrt{7}, \_\_, \_\_$

32) $1.28571428\_\_714\_\_\ldots$

33) $1, 4, \_\_, 16, 25, \_\_$

34) $\sqrt{24}, \_\_, \sqrt{26}, \_\_, \sqrt{28}, \sqrt{29}$

35) $0.727272\_\_2\_\_27272\ldots$

36) $81, 100, \_\_, 144, \_\_$

## 1.2   Converting Terminating Decimals into Fractions

Terminating
0.125
0.5

VS

Repeating
$0.\overline{6}$
0.33333333…
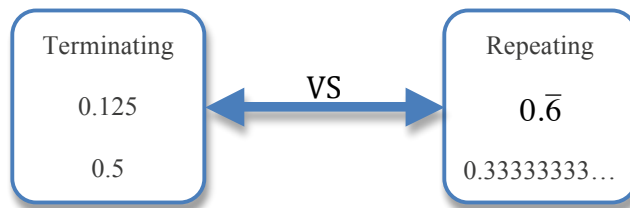
Remember how to convert a fraction into a decimal?

Example 1	Example 2	Example 3
$\dfrac{3}{4} = 0.75$	$\dfrac{2}{11} = 0.1818...$	$\dfrac{11}{8} = 1.375$
$\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ \underline{-28} \\ 20 \\ \underline{-20} \\ 0 \end{array}$	$\begin{array}{r} 0.1818... \\ 11\overline{)2.0000} \\ \underline{-11} \\ 90 \\ \underline{-88} \\ 20 \\ \underline{-11} \\ 90 \\ \underline{-88} \\ 2 \end{array}$	$\begin{array}{r} 1.375 \\ 8\overline{)11.000} \\ \underline{-8} \\ 30 \\ \underline{-24} \\ 60 \\ \underline{-56} \\ 40 \\ \underline{-40} \\ 0 \end{array}$

Remember place value?

Let's review the place values of the following number:

7 2 , 4 8 5 . 3 9 1 6
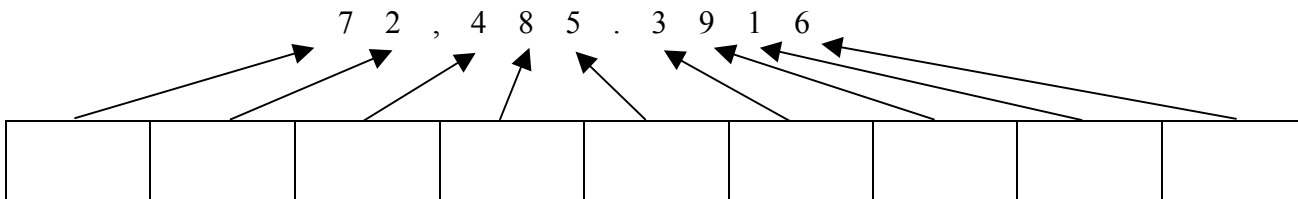
Fill in the boxes above using the terms below.

tenths	ten-thousands	hundredths	tens	ten-thousandths
hundreds	thousandths	ones	thousands	

Class Notes - Write each decimal as a fraction or mixed number in simplest form.

LP#1			
0.6	0.25	0.5271	0.456
LP#2			
2.8	-3.12	6.329	-1.75

Class Notes - Place a < , >, or = in between the expressions to make the sentence true.

LP#3 (convert decimal to fraction)			
$\dfrac{1}{10}$ 0.12	$\dfrac{2}{5}$ 0.7	$-2\dfrac{3}{10}$ -2.3	
LP#4 (convert fraction to decimal)			
$\dfrac{3}{5}$ 0.395	$\dfrac{1}{4}$ 0.1	0.6 $\dfrac{3}{20}$	

Lesson 1.2

Review - Convert the following decimals into fractions.

R#1 0.7	-0.15	0.032	0.1021	4.31
R#2 1.4	0.30	0.64	-2.042	0.05
R#3 -0.125	0.0121	-1.45	0.10005	9.77

Homework Problems

Convert the following decimals into fractions.

1) 0.5   **2)** 0.34   **3)** 0.743   **4)** 5.1251   **5)** 0.635

6) 0.87   **7)** 0.2   **8)** 0.6623   **9)** 0.007   **10)** 0.921

11) 2.941   **12)** 0.321   **13)** 0.9   **14)** 0.91   **15)** 0.5232

16) 0.007   **17)** 0.221   **18)** 0.13   **19)** 0.3   **20)** 0.0012

21) 0.06   **22)** 4.0003   **23)** 0.0302   **24)** 0.054   **25)** 0.1

**26)** 0.93   **27)** 52.25   **28)** 9.032   **29)** 0.00001   **30)** 0.932

State whether the following statements are true or false and justify your answer.

31) $\frac{3}{10} = 0.03$ **32)** $\frac{345}{1000} = 0.345$ **33)** $\frac{215}{10} = 2.15$ **34)** $\frac{4161}{1000} = 4.161$

35) $\frac{1}{5} = 0.2$ **36)** $\frac{3}{4} = 0.8$ **37)** $\frac{7}{20} = 0.35$ **38)** $\frac{320}{10} = 3.2$

Synthesis

39) Is there a fraction that only contains whole numbers in its numerator and denominator that is equivalent to $\sqrt{23}$? Explain your answer.

40) Is there a fraction that only contains whole numbers in its numerator and denominator that is equivalent to $\sqrt{49}$? Explain your answer.

41) Create a fraction with an irrational denominator. Express it as a decimal rounded to the nearest tenth.

42) Create a fraction with an irrational numerator. Express it as a decimal rounded to the nearest hundredth.

1.3 Converting Repeating Decimals into Fractions

Terminating		Repeating
0.125	VS	$0.\overline{6}$
0.5		0.33333333...
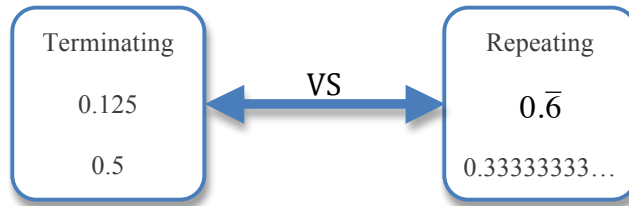
Remember – Where do repeating decimals come from?

$\dfrac{1}{3} = 0.\overline{3}$	$\dfrac{2}{11} = 0.1818...$
$\begin{array}{r} 0.333... \\ 3\overline{)1.000} \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 1 \end{array}$	$\begin{array}{r} 0.1818... \\ 11\overline{)2.0000} \\ \underline{-11} \\ 90 \\ \underline{-88} \\ 20 \\ \underline{-11} \\ 90 \\ \underline{-88} \\ 2 \end{array}$

Class Notes - Convert the following decimals into fractions.

Set 1 $0.\overline{3}$	$0.\overline{1}$
Set 2 0.4444444444444...	0.07777777777....

Set 3 0.18181818…	0.4545454545…

Review - Convert the following decimals into fractions.

R#1 $0.\overline{6}$	0.161616161616...
R#2 $0.\overline{5}$	0.72727272…

R#3 0.00$\overline{3}$	0.000$\overline{6}$

Homework Problems

Convert the following decimals into fractions.

1) 0.$\overline{2}$ **2)** 0.$\overline{7}$ **3)** 0.0$\overline{5}$ **4)** 0.00$\overline{8}$ **5)** 0.909090…   **6)** 0.$\overline{4}$

7) 0.$\overline{8}$ **8)** 0.7$\overline{3}$ **9)** 0.4$\overline{6}$ **10)** 0.1333333…   **11)** 0.9$\overline{3}$ **12)** 0.8666666…

13) State three fractions that are equivalent to a repeating decimal expression.

14) State three denominators to proper fractions that will always yield a terminating decimal no matter what numerator is used.

Synthesis

Convert the fractions into a decimal. Round to the nearest ten-thousandth.

15) $\frac{7}{9}$ **16)** $\frac{2}{3}$ **17)** $\frac{6}{11}$ **18)** $\frac{3}{22}$

Round the following decimals to the nearest thousandth and express your answer as a fraction.

19) 0.7$\overline{3}$ **20)** 0.$\overline{5}$ **21)** 0.08$\overline{3}$ **22)** 0.4$\overline{6}$

23) Can a radical expression have a repeating decimal other than zero? Explain.

24) Give 3 different rational approximations for $\sqrt{56}$. For each approximation state the name of the decimal that you rounded to.

25) What is the repeating decimal for the fraction $\frac{3}{7}$. Give 3 different approximations for this fraction.

Lesson 1.3

1.4 Rational Approximations for Irrational Numbers Using a Number Line

Rational Radicals		Irrational Radicals
$\sqrt{16}$ $\sqrt{49}$	VS	$\sqrt{21}$ $\sqrt{54}$
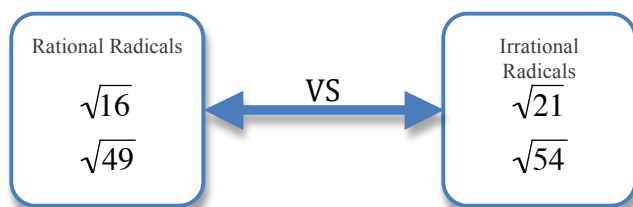
List of Perfect Squares

x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
x^2															

Without using a calculator, approximate the value of $\sqrt{39}$ to the nearest whole number.

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Class Notes – Estimate the values of the each radical expression to the nearest whole number using a number line.

Set 1 $\sqrt{20}$	$\sqrt{52}$	$\sqrt{93}$
Set 2 $\sqrt{14}$	$\sqrt{2}$	$\sqrt{46}$
Set 3 $\sqrt{30}$	$\sqrt{125}$	$\sqrt{200}$

Review - Approximate the values of the each radical expression to the nearest whole number utilizing a number line.

R#1 $\sqrt{58}$	$\sqrt{109}$	$\sqrt{40}$
R#2 $\sqrt{32}$	$\sqrt{260}$	$\sqrt{10}$

R#3 $\sqrt{3}$	$\sqrt{145}$	$\sqrt{17}$

Homework
Approximate the values of the each radical expression to the nearest whole number utilizing a number line.

1) $\sqrt{13}$ **2)** $\sqrt{53}$ **3)** $\sqrt{300}$ **4)** $\sqrt{85}$ **5)** $\sqrt{41}$

6) $\sqrt{61}$ **7)** $\sqrt{182}$ **8)** $\sqrt{22}$ **9)** $\sqrt{111}$ **10)** $\sqrt{97}$

11) $\sqrt{525}$ **12)** $\sqrt{219}$ **13)** $\sqrt{19}$ **14)** $\sqrt{5}$ **15)** $\sqrt{405}$

16) $\sqrt{1250}$ **17)** $\sqrt{10}$ **18)** $\sqrt{60}$ **19)** $\sqrt{198}$ **20)** $\sqrt{740}$

Synthesis

21) If the $\sqrt{1} = 1$ and $\sqrt{9} = 3$, then $\sqrt{\frac{1}{9}} = ?$

22) If the $\sqrt{1} = 1$ and $\sqrt{36} = 6$, then $\sqrt{\frac{1}{36}} = ?$

23) Evaluate $\sqrt{\frac{1}{64}} =$
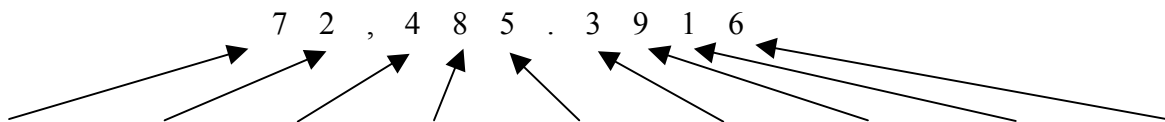
24) Evaluate $\sqrt{\frac{1}{100}} =$

25) Evaluate $\sqrt{\frac{1}{4}} =$

26) Find two radical expressions that the mixed number $5\frac{31}{100}$ falls in-between.

27) Find two radical expressions that the mixed number $11\frac{3}{25}$ falls in-between.

Lesson 1.4

1.5 Rational Approximations for Irrational Numbers Using a Calculator

State the place value for each digit.

7 2 , 4 8 5 . 3 9 1 6

Class Notes – Use your calculator to find a rational approximation for each radical expression.

Set 1 – Round to the nearest tenth $\sqrt{20}$	$\sqrt{52}$	$\sqrt{93}$
Set 2 – Round to the nearest thousandth $\sqrt{14}$	$\sqrt{2}$	$\sqrt{46}$
Set 3 – Round to the nearest millionth $\sqrt{30}$	$\sqrt{125}$	$\sqrt{200}$

Review - Use your calculator to estimate each radical expression.

R#1 – Round to the nearest hundredth $\sqrt{58}$	$\sqrt{109}$	$\sqrt{40}$
R#2 – Round to the nearest tenth $\sqrt{32}$	$\sqrt{260}$	$\sqrt{10}$
R#3 – Round to the nearest thousandth $\sqrt{3}$	$\sqrt{145}$	$\sqrt{17}$

Homework
Use your calculator to find a rational approximation for each radical expression. Round your approximations to the *nearest ten-thousandth*.

1) $\sqrt{13}$ **2)** $\sqrt{53}$ **3)** $\sqrt{300}$ **4)** $\sqrt{85}$ **5)** $\sqrt{41}$

6) $\sqrt{61}$ **7)** $\sqrt{182}$ **8)** $\sqrt{22}$ **9)** $\sqrt{111}$ **10)** $\sqrt{97}$

Estimate each radical expression to the *nearest hundredth*.

11) $\sqrt{525}$ **12)** $\sqrt{219}$ **13)** $\sqrt{19}$ **14)** $\sqrt{5}$ **15)** $\sqrt{405}$

16) $\sqrt{1250}$ **17)** $\sqrt{10}$ **18)** $\sqrt{60}$ **19)** $\sqrt{198}$ **20)** $\sqrt{740}$

21) Find a rational approximation for $\sqrt{62}$ to the nearest hundredth.

22) Find a rational approximation for $\sqrt{15}$ to the nearest ten

23) Find a rational approximation for $\sqrt{125}$ to the nearest tenth.

Synthesis

24) If the $\sqrt{16} = 4$ and $\sqrt{25} = 5$, then $\sqrt{16/25} = ?$

25) If the $\sqrt{81} = 9$ and $\sqrt{49} = 7$, then $\sqrt{81/49} = ?$

26) Evaluate $\sqrt{36/64} =$

27) Evaluate $\sqrt{9/100} =$

28) Evaluate $\sqrt{121/4} =$