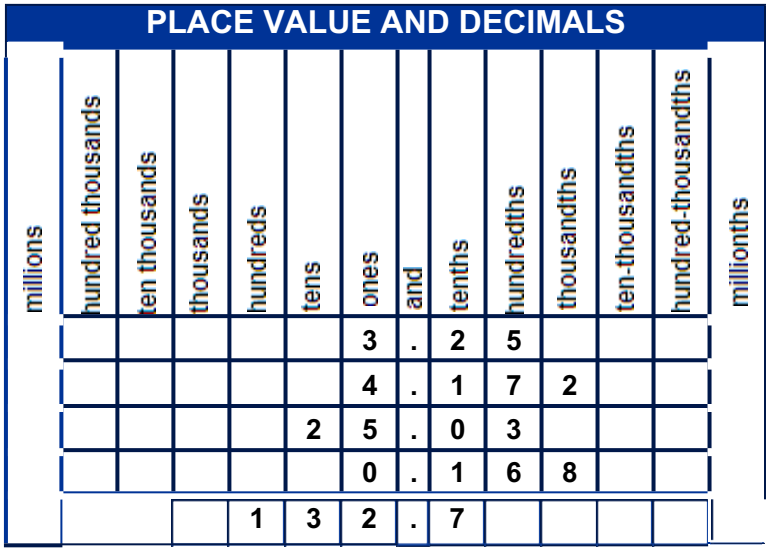
5th Grade Math ***Unit 2: Numbers and Operations in Base Ten***

Student Study Guide

Unit 2 Common Core Math Standards:

MCC5.NBT.1 *Understand the place value system from thousandths to one million.*

- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).



Note that **0.168** has the same value as **.168**. However, the zero in the ones place helps us remember that **0.168 is a number less than one.** From this point on, when writing a decimal that is less than one, we will always include a zero in the ones place.

Phrase	Decimal
fifty-six hundredths	0.56
nine tenths	0.9
thirteen and four hundredths	13.04
twenty-five and eighty-one hundredths	25.81
nineteen and seventy-eight thousandths	19.078

Decimal	Phrase
0.005	five thousandths
100.6	one hundred and six tenths
2.28	two and twenty-eight hundredths
71.062	seventy-one and sixty-two thousandths
3.0589	three and five hundred eighty-nine ten-thousandths

Expanded Form

We can write the whole number 159 in expanded form as follows: 159 = (1 x 100) + (5 x 10) + (9 x 1). Decimals can also be written in expanded form. Expanded form is a way to write numbers by showing the value of each digit. This is shown in the example below.

Example 4:

Decimal		Expanded form
4.12	=	$(4 \times 1) + (1 \times \frac{1}{10}) + (2 \times \frac{1}{100})$
0.9	=	$(0 \times 1) + (9 \times \frac{1}{10})$
9.735	=	$(9 \times 1) + (7 \times \frac{1}{10}) + (3 \times \frac{1}{100}) + (5 \times \frac{1}{1000})$
1.0827	=	$(1 \times 1) + (0 \times \frac{1}{10}) + (8 \times \frac{1}{100}) + (2 \times \frac{1}{1000}) + (7 \times \frac{1}{10000})$

MCC5.NBT.3 *Read, write and compare decimals to thousandths.*

- Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Decimal numbers are compared in the same way as other numbers: by comparing the different place values from left to right. We use the symbols <, > and = to compare decimals as shown below.

Comparison	Meaning
0.2 > 0.15	0.2 is greater than 0.15
0.15 < 0.2	0.15 is less than 0.2
0.2 = 0.2	0.2 is equal to 0.2
0.15 = 0.15	0.15 is equal to 0.15

When comparing two decimals, it is helpful to write one below the other. This is shown in the next example.

Example 2: Which is greater, 0.57 or 0.549?

Analysis: Let's compare these decimals using a place-value chart.

ones	and	tenths	hundredths	thousandths
0	.	5	7	0
0	.	5	4	9

Answer: 0.57 is greater than 0.549.

Notation: 0.57 > 0.549

As you can see in the example above, 0.57 has fewer decimal digits than 0.549. It is easier to compare two decimals when you have the same number of decimal digits, so an extra zero was written to the right of the digit 7 in the decimal 0.57. We are able to do this because 0.57 and 0.570 are equivalent decimals.

Example 4: Order these decimals from least to greatest: 3.87, 3.0875, 3.87502, 3.807

We have been asked to order four decimal numbers. Let's start by writing one decimal beneath the other in their original order.

3.87
3.0875
3.87502
3.807

Next, examine each decimal, writing one or more zeros to the right of the last digit, so that all decimals have the same number of decimal digits.

3.87000
3.08750
3.87502
3.80700

Now we can compare two decimals at a time. We will write a number in a circle next to each decimal to denote its order.

3.87000 ③
3.08750 ①
3.87502 ④
3.80700 ②

From least to greatest, we get: 3.08750, 3.80700, 3.87000, 3.87502

Answer: Ordering these decimals from least to greatest we get: 3.0875, 3.807, 3.87, 3.87502

MCC5.NBT.4 *Use place value understanding to round decimals to any place.*

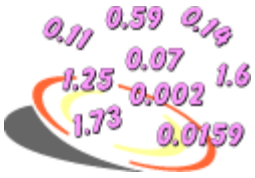
27.17469 rounded to the nearest whole number is 27
36.74691 rounded to the nearest whole number is 37
12.34690 rounded to the nearest tenth is 12.3
89.46917 rounded to the nearest tenth is 89.5
50.02139 rounded to the nearest hundredth is 50.02
72.63539 rounded to the nearest hundredth is 72.64
46.83531 rounded to the nearest thousandth is 46.835
9.63967 rounded to the nearest thousandth is 9.640

Rules for rounding decimals.

1. Retain the correct number of decimal places (e.g. 3 for thousandths, 0 for whole numbers)
2. If the next decimal place value is 5 or more, increase the value in the last retained decimal place by 1.

MCC5.NBT.7*. Add and subtract decimals to hundredths. Explain the relationship between concrete models, drawings, and written representations.*

Procedure: **To add decimals, follow these steps:**



1. Line up all the decimal points in a column.
2. When needed, write one or more extra zeros to the right so that both decimals have the same number of decimal digits.
3. Start on the right, and add each column in turn. (Add digits in the same place-value position.)
4. If you need to carry, remember to add the tens digit of that column to the next column.
5. Place the decimal point in the sum.

Example 2: Subtract: 8.06 - 8.019

Step 1: You must first line up the decimal points in a column.

$$\begin{array}{r} 8.06 \\ -\ 8.019 \\ \hline \end{array}$$

Step 2: The decimals in this problem do not have the same number of decimal digits. You can write an extra zero to the right of the last digit of the first decimal so that both decimals have the same number of decimal digits.

$$\begin{array}{r} 8.060 \\ -\ 8.019 \\ \hline \end{array}$$

Step 3: Start on the right, and subtract each column in turn. (Subtract digits in the same place-value position.)

$$\begin{array}{r} {\scriptstyle 1} \\ 8.060 \\ -\ 8.019 \\ \hline 1 \end{array}$$

Step 4: If the digit you are subtracting is bigger than the digit you are subtracting from, you have to borrow a group of ten from the column to the left.

$$\begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 1 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 41 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 041 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 0\,041 \end{array}$$

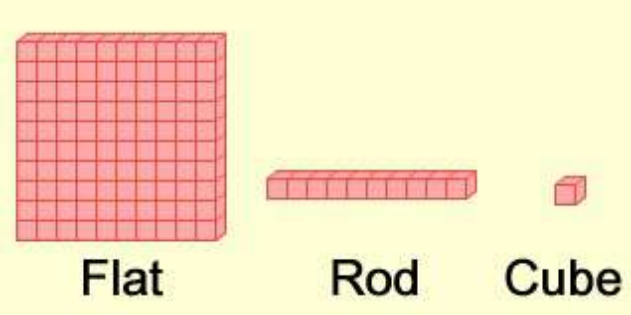
Step 5: Be sure to place the decimal point in the difference.

$$\begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 1 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 41 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 041 \end{array} \rightarrow \begin{array}{r} {\scriptstyle 5\,1} \\ 8.0\cancel{6}0 \\ -\ 8.019 \\ \hline 0.041 \end{array}$$

Answer: The difference is 0.041.

Most people in the world use a **base-10 system**. Each place in this system represents 10 times as much as the next place to the right. For example, 345 means 3 hundreds + 4 tens + 5 ones.

There are three types of blocks: *flats*, *rods*, and *cubes*.



A flat is worth 1 whole.

A rod is worth one tenth (0.1).

A cube is worth one hundredth (0.01).

***Websites and Resource for **Math Tutorials and Extra Practice** (aligned to the 5th Grade Common Core State Standards):

http://www.helpingwithmath.com/by_grade/gr5_cc_skills.htm

http://www.k-5mathteachingresources.com/5th-grade-number-activities.html

http://www.khanacademy.org/

http://nsdl.org/commcore/math?id=5

https://sites.google.com/a/norman.k12.ok.us/mr-wolfe-s-math-interactive-whiteboard/5th-grade

http://pinterest.com/teaching4real/5th-grade-common-core/

http://www.mathscore.com/math/standards/Common%20Core/5th%20Grade/

http://www.ixl.com/math/standards/common-core/grade-5

http://intermediateelem.wikispaces.com/Fifth+Grade+Math+Resource+Backup

http://mail.clevelandcountyschools.org/~ccselem/?OpenItemURL=S07BB59E1