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STUDY GUIDE – Decimal and Place Values

!! READ THIS BEFORE GOING TO THE NEXT PAGE!!

How to use this study guide: "Mr. V., do we really need to go through all X pages of the study guide?" **NO!!!** The study questions are at end on the page that says "your turn." What are the extra pages with examples for? **THOSE ARE NOTES AND EXAMPLES!!!** If you don't feel like you need to review the notes, go straight to the questions.

How do I know which section to look at? The questions and sections are color-coded. Having a hard time with question 4? Go to the section that is highlighted the same color as it (in this case, section 2).

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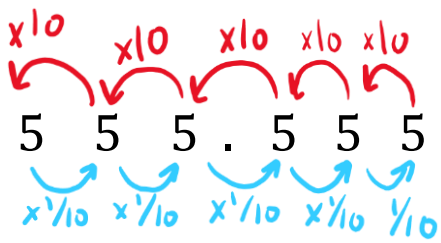
SECTION 1

For chapter 3, we've learned how place values are related to each other, how we can decompose and recompose them, and how we can order, compare, and round decimal values.

RECALL that each place value is 10x as much as or $\frac{1}{10}$ of another place value depending on whether we are going to the larger or smaller place value. See the example below.



How can we interpret this? Well, the 5 in the hundreds place (500) is **10 times as great as** the 5 in the tens place (50). In the opposite direction, the 5 in the tens place (50) is $\frac{1}{10}$ the value of the 5 in the hundreds place (500). Remember – each place has a **value!** The 5 digit in the ones is worth 5, the 5 digit in the tenths is worth 0.5, etc.

At this point, try questions 1 & 2.

SECTION 2

Additionally, we can compare two or more decimals by comparing **place-by-place.** Let's order the following three decimals from **greatest to least:** 1.342, 1.351, 1.343.

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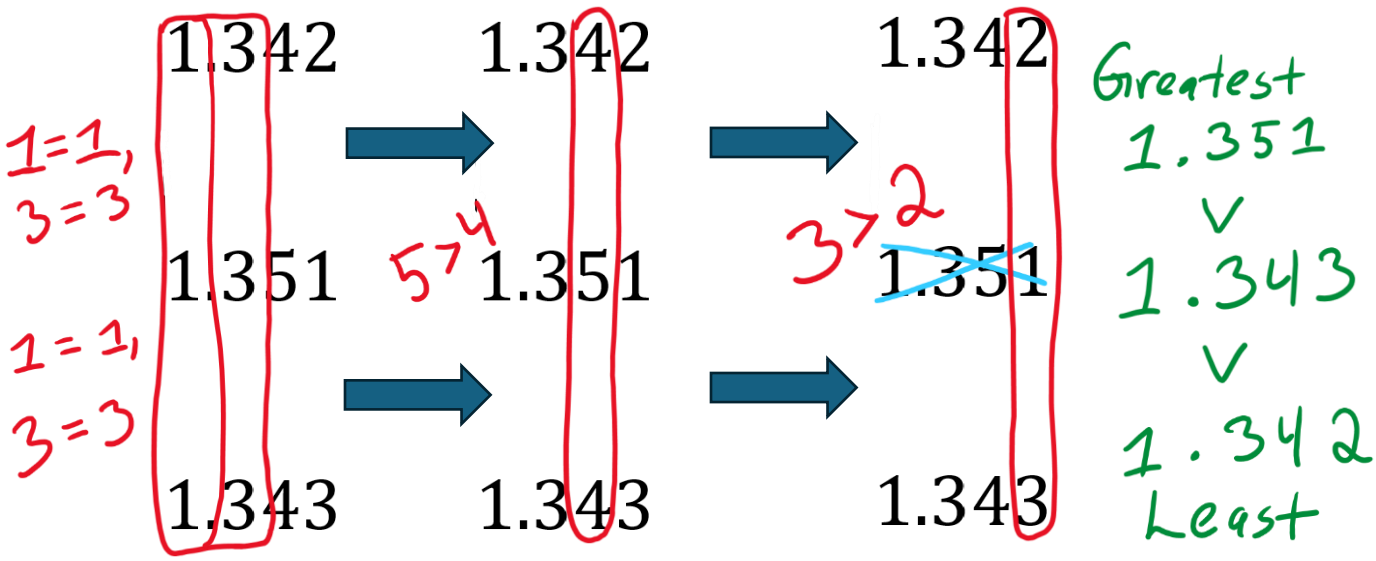

EXPLANATION: The 1 in the ones place is the same, so we move to the tenths place, but the 3 is the same for all those values, so let's move to the hundredths. 5 is the greatest value here, so we know 1.351 is the first number in the list so we can remove it… but two numbers have 4 in the hundredths, so let's move to the thousandths.

Now, 3 thousandths is more than 2 thousandths, so we know 1.343 is greater than 1.342. This leaves us with the following list: 1.351 > 1.343 > 1.342. Done!

At this point, try questions 3 – 5.

SECTION 3

It's important we understand how we can use our numerical forms (standard, word, and expanded; more on this soon) to decompose and recompose a number. The chart below is a quick refresher on what the forms look for the example number **25.136:**

Form	Representation
Standard	25.136
Word	"Twenty-Five **and** One-Hundred Thirty-Six Thousand**ths**."
Expanded	$(2 \times 10) + (5 \times 1) + \left(1 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{100}\right) + (6 \times \frac{1}{1000})$

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How does this information help us? Knowing the place **values** and how much each digit is worth lets us break down the number into different ways. For example, we can use the expanded form to break down 25.136 in the following 2 ways:

Standard-Form Decomposition

Tens	Ones	"AND"	Tenths	Hundredths	Thousandths
2	5	.	1	3	6

Word-Form Decomposition

Tens	Ones	"AND"	Tenths	Hundredths	Thousandths
2	5	.	0	0	126

But you can be challenged to **not** be able to use a certain place. For example, how could we decompose this number if you are allowed to use any place **besides** the tenths place? Either remember: One tenth is composed of 10 hundredths, **or** use the "push down method" by moving the 1 to the next place you can use (the hundredths). Either understanding will give you the follow result:

Word-Form Decomposition

Tens	Ones	"AND"	Tenths	Hundredths	Thousandths
2	5	.	Ø	13	6

We can even recompose use the same knowledge, for example, what number is made up of three ones, fifteen tenths, twelve hundredths, and finally eight thousandths? **First convert all these pieces to word form, then sum (add) them.**

$$3 + 1.5 + 0.12 + 0.008 = 4.628$$

At this point, try questions 6 – 8.

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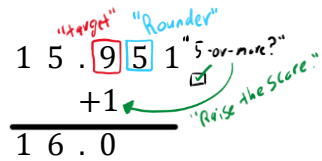
Section 4

Finally, we come to rounding. When rounding, we should identify (and name) our target place value (generally, we are asked to "round[ed] to the nearest [place value]"), and use the digit on the right we can call our rounder. As a reminder of our rhyme,

"5-or-more, raise the score; 4 or less, let it rest."

That is to say, if our rounder digit is 5 or greater, we **add one** to our target place value, but 4 or less, and we keep it the same. From there, we get rid of all decimal digits after the target place value (and for whole number place values like ones or tens, we turn ones after the target into zeroes).

Example: Round 15.951 to the nearest **tenth.**



At this point, try questions 9 – 12.

(Go to the next page for the questions.)

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1. What number is 10 times as great as 0.15? Name the place value of the final digit of the new number.

2. What number is $\frac{1}{10}$ of 2.7? Name the place value of the final digit of the new number.

3. Order the following numbers from **least to greatest:**

   1.752, 1.753, 1.761, 1.841

4. Order the following numbers from **greatest to least:**

   5.954, 5.945, 5.953, 5.962

5. What is the unknown digit (the question mark) that makes the following statement true?

$$5.441 \quad < \quad 5.4?1 \quad < \quad 5.461$$

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6. Rewrite 51.632 in Word Form **AND** expanded form.

7. What number is composed of 6 ones, 15 tenths, 22 hundredths, and 9 thousandths?

8. Decompose the following number in **three ways**. You MUST also use the decomposition that already has a 0.

5.531

___ Ones ___ Tenths ___ Hundredths ___ Thousandths

___ Ones ___ Tenths ___ Hundredths ___ Thousandths

___ Ones ___ Tenths 0 Hundredths ___ Thousandths

9. Round 15.252 to the nearest tenth.

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10. Round 169.61 to the nearest whole (ones).

11. Name the place to which the number was rounded:

    183.132 to 183.1. It rounded to the _____ place.

12. Round 30.919 to the underlined place value. Name that place value and write its value (for example, “0.1” or “0.01”).