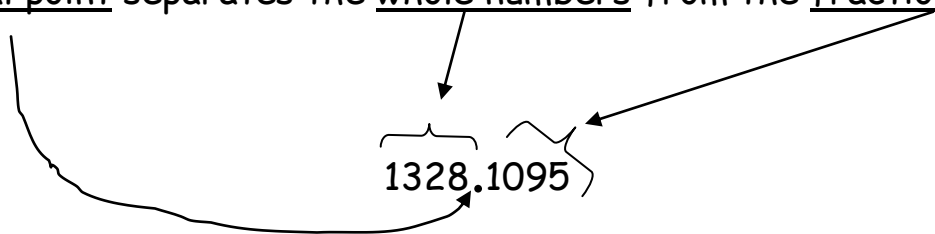
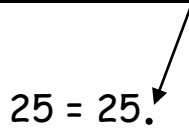


## Decimal Place Values

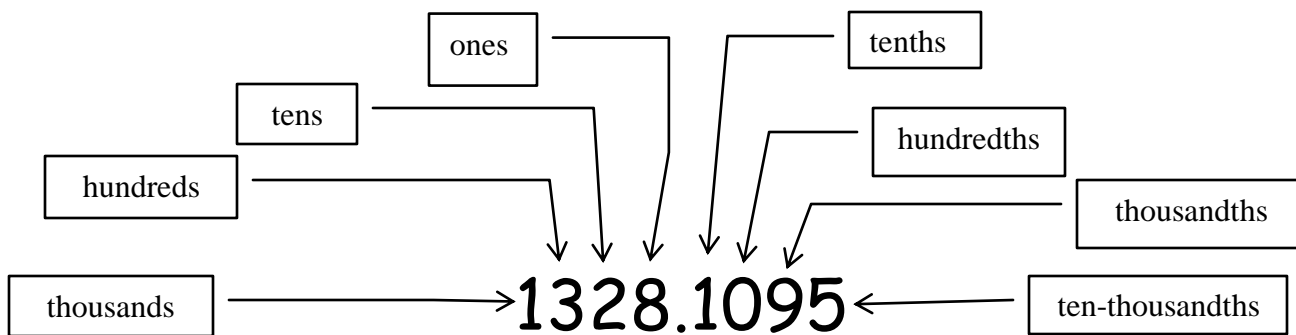
The decimal point separates the whole numbers from the fractional part of a number.



In a whole number the decimal point is all the way to the right, even if it is not shown in a problem.



The place values of the number 1328.1095 are shown below:



In word problems you will be asked to translate numbers from English. The word "and" is where the decimal point will go.

Write the following numbers:

Fifty-eight = 58

One-hundred twenty-five thousandths = .125

One hundred and twenty-five thousandths = 100.025

Eleven and three hundredths = 11.03

Six thousand forty and nine tenths = 6,040.9

## Multiplying Decimal Numbers

When multiplying decimal numbers, set up the problem like regular multiplication. When you get your answer, add up the total number of digits to the right of the decimals in both the numbers you are multiplying and place the decimal in your answer that many places from the right end.

$$\begin{array}{r} .02 \times .008 \\ \times .02 \\ \hline .00016 \end{array}$$

three digits

two digits

five digits

.00016 is the answer

$$\begin{array}{r} 20 \times .8 \\ \times .8 \\ \hline 16.0 \end{array}$$

16.0 is the answer

When multiplying three numbers together, multiply any two to get an answer; then multiply that answer by the third number.

$$\begin{array}{r} 1.02 \\ \times .3 \\ \hline .306 \\ .306 \\ \times 46 \\ \hline 1836 \\ 1224 \\ \hline 14.076 \end{array}$$

two digits

one digit

three digits

.3 × 1.02 × 46

14.076 is the answer

## Dividing Decimal Numbers

Here are the three ways you will see division problems; they all mean the same thing:

$$\begin{array}{r} 46.58 \\ 2.1 \end{array}$$

$$2.1 \overline{)46.58}$$

$$46.58 \div 2.1$$

When dividing decimal numbers, move the decimal point in the divisor (number you're dividing by) to the right end of the divisor. Then move the decimal point in the dividend (the number you're dividing into) the same number of places to the right as you moved it in the divisor.

$$2.1 \overline{)46.58}$$

$$.100 \overline{)8.100}$$

$$4 \overline{)6.1}$$

$$.8 \overline{)11.0}$$

Once you have placed the decimal point correctly in your **quotient** (answer), divide like you would in whole numbers.

$$\begin{array}{r} 23 \\ .2 \overline{)4.6} \\ \underline{4} \\ 6 \\ \underline{6} \\ 0 \end{array}$$

$$\begin{array}{r} 20. \\ .26 \overline{)5.20} \\ \underline{52} \\ 0 \end{array}$$

$$\begin{array}{r} 9.4117 \\ 1.7 \overline{)16.00000} \\ \underline{153} \\ 70 \\ \underline{68} \\ 20 \\ \underline{17} \\ 30 \\ \underline{17} \\ 130 \\ \underline{119} \\ 11 \end{array}$$

Rounded to hundredth

$$\begin{array}{r} .173 \\ 15 \overline{)2.600} = .17 \\ \underline{15} \\ 110 \\ \underline{105} \\ 50 \\ \underline{45} \\ 5 \end{array}$$

## Word Problems using Decimal Numbers

Definitions: Sum - the answer from adding numbers  
Difference - the answer from subtracting numbers  
Product - the answer from multiplying numbers  
Quotient - the answer from dividing numbers

In solving word problems, try to understand the whole situation being described. Some numbers may not even be involved in answering the question. Sometimes you will have to do extra steps to get the numbers you need to solve the problem.

If the annual rainfall for a town near Santa Fe was 12.3 inches in 1960, 13.2 inches in 1961, and 11.5 in 1962, what was the total rainfall for the three years?

12.3

13.2

"Total" means to add  $\begin{array}{r} + 11.5 \\ \hline 37.0 \end{array}$  37.0 inches is the answer

What is the difference between David's salary of \$523.86 per month and Robert's monthly salary, which is \$318.90?

523.86

"Difference" means to subtract  $\begin{array}{r} - 318.90 \\ \hline 204.96 \end{array}$  \$204.96 is the answer

If you have a car that used 19.2 gallons of gas to go 285 miles, how many miles per gallon (mpg) did the car get? (round your answer to the nearest tenth.)

$\text{mpg} = \frac{\text{miles}}{\text{gallon}} = \frac{285 \text{ miles}}{19.2 \text{ gallon}}$ ; so divide 19.2 into 285

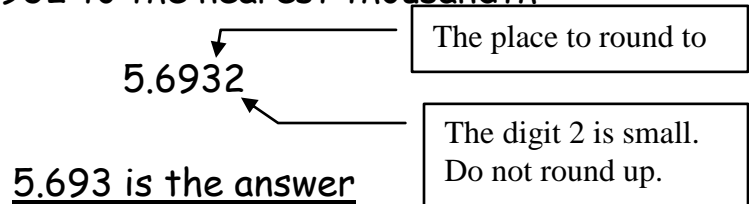
$\begin{array}{r} 14.84 \\ 19.2 \overline{)285.000} \end{array}$

14.8 mpg is the answer

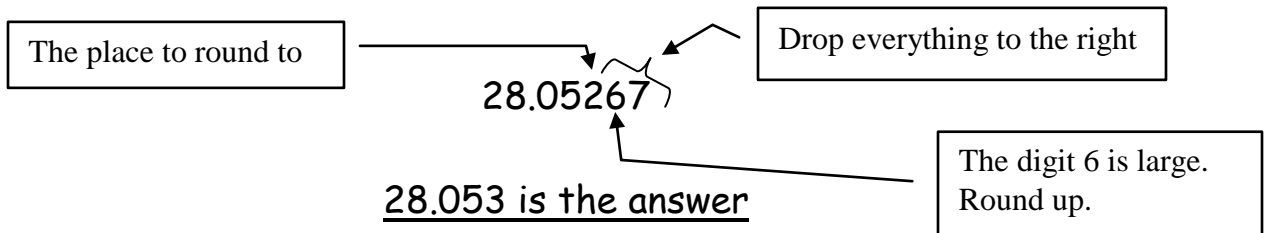
## Rounding Decimal Numbers

When rounding decimal numbers, first look at the number place you are asked to round to. Then look at the digit (number) just to its right. If that digit is smaller than 5 (0, 1, 2, 3, or 4), then do not round up. If the digit is 5 or larger (5, 6, 7, 8, 9), then round up.

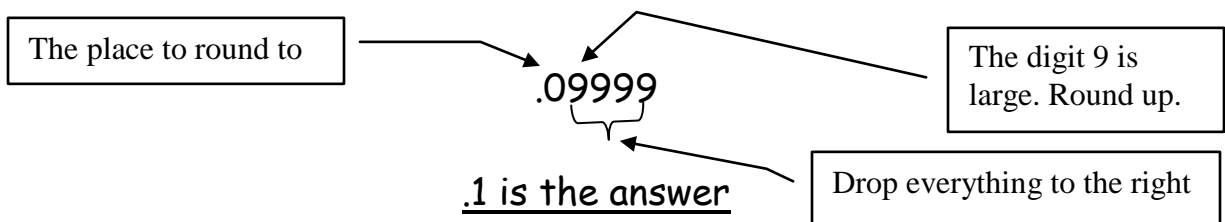
Round 5.6932 to the nearest thousandth



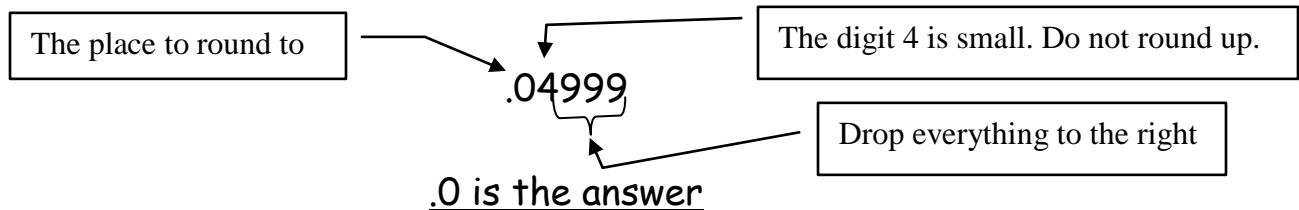
Round 28.05267 to the nearest thousandth



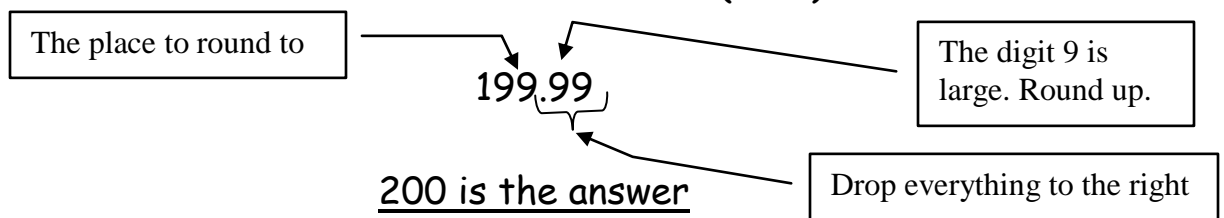
Round .09999 to the nearest tenth



Round .04999 to the nearest tenth



Round 199.99 to the nearest whole (ones) number



## Decimal/Fraction Conversion

Changing fractions and mixed numbers to decimal numbers simply by dividing the denominator (bottom number) into the numerator (top number).

$$\frac{1}{2} \Rightarrow 2 \overline{)1.0} \quad \frac{1}{2} = 0.5$$

$$\frac{1}{3} \Rightarrow 3 \overline{)1.000}$$

$$\frac{1}{3} = 0.333$$

$$\begin{array}{r} 10 \\ 9 \\ \hline 10 \\ 9 \\ \hline 10 \\ 9 \\ \hline \end{array}$$

Rounded to the nearest thousandth or Use repeating dash over the first  $\overline{3} = .\overline{3}$

$$4\frac{3}{5} \Rightarrow 5 \overline{)3.0} \quad 4\frac{3}{5} = 4.6$$

$$4\frac{3}{5} = 4.6$$

The whole number in front of the fraction will also be in front of the decimal.

Changing decimal numbers into fractions and mixed numbers is as easy as saying the number as a fraction then writing it down. Remember to reduce and simplify.

$$.2 = \text{"two tenths"} = \frac{2}{10} = \frac{1}{5}$$

$$.37 = \text{"thirty-seven hundredths"} = \frac{37}{100}$$

$$.420 = \text{"four hundred twenty thousandths"} = \frac{420}{1000} = \frac{21}{50}$$

$$18.32 = \text{"eighteen and thirty-two hundredths"} = 18\frac{32}{100} = 18\frac{8}{25}$$

Arrange from the smallest to the largest:  
**3.018    3.18    3.1    3.08    .318**

The only clue here is that .318 does not have a whole number; therefore, it is the smallest.

In the tenths place 3.018 and 3.080 have zeroes; therefore, they are the next smallest numbers. Since 3.018 has a 1 in the hundredths place, it is smaller.

The two largest numbers are left over. Compare 3.180 and 3.100 by looking at hundredths place. Since 3.100 has a zero there, it is smaller and 3.180 is the largest of all the numbers.

from smallest to largest, they are:  
**.318    3.018    3.08    3.1    3.18**

### Exercise 7

Directions: arrange these numbers from largest to smallest:

1) 2.62            2.061            2.612            0.66            6.21

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2) 14.01            140.1            1.401            14.1            14.11

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3) .0067            .007            .00618            .00701            .006

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4) .1            .01            1            1.1            .019

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5) 5.1            5            5.01            5.09            5.91

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