The Meaning of Decimals

Every number of arithmetic may be written as a fraction. A decimal fraction is a common fraction whose denominator is 10, 100, 1000, or a higher power of ten. A decimal is a symbol used instead of an equivalent fraction because decimals greatly simplify writing and computation.

. is the symbol for the decimal fraction \(\frac{7}{10}\).

The dot is called a decimal point. .7 may be read “7 tenths” or “point 7”.

The positions to the right of the decimal point are called decimal places.

To understand decimal numbers we use a place-value chart.

<table>
<thead>
<tr>
<th>Whole Number Place Values</th>
<th>Decimal Place Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Thousands</td>
<td>Thousandths</td>
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<tr>
<td>Thousands</td>
<td>Hundredths</td>
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<tr>
<td>Hundreds</td>
<td>Tens</td>
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<tr>
<td>Units</td>
<td>Decimals</td>
</tr>
<tr>
<td></td>
<td>0.1</td>
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<tr>
<td></td>
<td>0.01</td>
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<tr>
<td></td>
<td>0.001</td>
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<tr>
<td></td>
<td>0.0001</td>
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<td></td>
<td>0.00001</td>
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</tbody>
</table>

Note that from left to right, each place value, whether whole number or decimal is ten time the next place value. Thus, 1000 = 10 x 100 and 0.2 = 10 x 0.01.

Reading Decimals

The fraction \(\frac{5}{10}\) and the decimal .05 are read “5 hundredths.”

The fraction \(\frac{25}{100}\) and the decimal .25 are read “25 hundredths.”

The fraction \(\frac{2}{1000}\) and the decimal .002 are read “2 thousandths.”

OBSERVE: The number of places to the right of the decimal point equals the number of zeros in the denominator of the fraction that represents the decimal.

RULES FOR READING DECIMALS:

1. Read the number to the right of the decimal point as you would a whole number.
2. End with the place value of the rightmost digit.
   Thus, .025 is read “25 thousandths” since the rightmost digit 5 is in the thousandths place.
3. Use “and” only when naming the decimal point.
   Thus, .702 is read “seven hundred two thousandths.” The reading “seven hundred two thousandths” may be mistaken for 700.002.

Another method – Read the decimal by saying the digits in order from left to right. Use “point” to name the decimal point.
FOLD ALONG THE LINE
Write your answers on another sheet of paper. Then compare with the answers on the right.

I. Write each fraction a) as a decimal and b) as it is read.
   1. \( \frac{2}{10} \)  
      a) .2  b) 2 tenths
   2. \( \frac{3}{100} \)  
      a) .03  b) 3 hundredths
   3. \( \frac{77}{100} \)  
      a) .77  b) seventy-seven hundredths
   4. \( \frac{5}{1000} \)  
      a) .005  b) five thousandths
   5. \( \frac{35}{1000} \)  
      a) .035  b) thirty-five thousandths
   6. \( \frac{455}{1000} \)  
      a) .455  b) four hundred fifty-five thousandths
   7. \( \frac{7}{10000} \)  
      a) .0007  b) seven ten thousandths
   8. \( \frac{48}{10000} \)  
      a) .0048  b) forty-eight ten thousandths
   9. \( \frac{155}{10000} \)  
      a) .0155  b) one hundred fifty-five ten thousandths
  10. \( \frac{3525}{10000} \)  
      a) .3525  b) three thousand five hundred twenty-five ten thousandths

II. Write the following decimals as fractions:
   1. .73  
      a) \( \frac{73}{100} \)
   2. .0067  
      a) \( \frac{67}{10000} \)
   3. 1.46  
      a) \( \frac{146}{100} \)
   4. .035  
      a) \( \frac{35}{1000} \)
   5. .0155  
      a) \( \frac{155}{10000} \)

III. Write as decimals:
   1. Thirty-seven and fifty-six hundredths
   2. Two hundred eight and four thousandths
   3. Nine point five four
   4. Seven hundred twenty-four millionths
   5. One hundred eighty-three ten thousandths