Decimals

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Objectives

- Understanding Decimals and Place Values
- Adding/Subtracting Decimals
- Multiplying Decimals
- Dividing Decimals
- Converting a Fraction to a Decimal
- Converting a Decimal to a Fraction
- Caliper and Micrometer Introduction

Place Values with Whole Numbers

- Recall from Whole Numbers
  - Example: What are the place values for 24,581?

- What is the number rounded to the nearest thousands?

- What is the number rounded to the nearest tens?

Place Values with Decimals

- Place Values to the right of the decimal place:
  - The decimal place is read as “and”
  - Example: Write out in words: 13.4

- Example: Write out in words: 4.052

Place Values with Decimals

- Examples: Write as a number in fraction form and decimal form
  - Two hundred seven and thirty-four hundredths
  - Sixteen thousandths

Rounding Decimals

- Rounding can be to a certain place value or a certain number of decimal places.
- Example: Round 54.4375
  - To the nearest tenth:
  - To the nearest thousandth:
  - To two decimal places:
  - To three decimal places:
Try Yourself

- Round 43,992.53125
  - To one decimal place:
  - To the nearest tens place:
  - To the nearest hundredths place:
  - To three decimal places:
  - To the nearest thousands place:

Adding/Subtracting Decimals

- For basic operations, we will usually use a calculator when working with decimals, but we will look at how to do each operation by hand.
- For addition and subtraction, make sure the place values are lined up, just as with whole numbers. The decimal place is brought directly down.
- Example: 12.75 + 6.375 + 9

Adding/Subtracting Decimals

- Example: 2.625 – 1.875
- Example: 35 – 24.25

Application Problem – Try Yourself

- Find missing dimensions A, B, and C. All corners are square.

Application Problem – Try Yourself

- You are asked to cut some tubing to be certain lengths. The tolerance is ± 0.0625". List the shortest and longest allowable lengths of the parts.

<table>
<thead>
<tr>
<th>Blueprint Length</th>
<th>Lowest Allowable Measurement</th>
<th>Highest Allowable Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.75&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.8125&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0625&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.375&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multiplying Decimals

- First calculate the answer by multiplying the decimals in fraction form:
  - 0.3 × 0.7
### Multiplying Decimals
- 1. Multiply the numbers, ignoring the decimals.
- 2. Count the total number of decimal places in the original problem.
- 3. The total will be the number of decimal places in the multiplied answer.
- Example: $10.5 \times 0.75$

### Dividing Decimals
- 1. Write as a long division problem.
- 2. Move the decimal to the right on the divisor (on outside) until the divisor is a whole number.
- 3. Move the decimal the same number of places on the dividend (on inside).
- 4. Divide normally and bring the decimal place directly up.
- Example: (Round to the nearest hundredth.) $4.375 \div 3.5$

### Application Problem – Try Yourself
You are cutting some parts and that have lengths of 2.625”, 2.5”, 2.5625”, 2.625”, and 2.53125”. You need to list what the average length of the parts is. (Average means take the sum and divide by the number of items you added.)

### Application Problem – Try Yourself
Complete the following weight and cost list for a project

<table>
<thead>
<tr>
<th>Metal Parts</th>
<th>Length of Part (in)</th>
<th>Weight (pounds per in)</th>
<th>Total Weight</th>
<th>Cost per Ft</th>
<th>Cost per Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>46.50”</td>
<td>0.317</td>
<td>$3.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>12.75”</td>
<td>0.574</td>
<td>$8.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>84.00”</td>
<td>0.250</td>
<td>$2.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

W= _____  C= _____

### Converting a Fraction to a Decimal
- To change a fraction into a decimal take the numerator ÷ denominator:
- Example: $\frac{2}{8}$
- Example: $\frac{19}{16}$
- Example: $\frac{25}{32}$

### Converting a Fraction to a Decimal
- Show with repeating notation and round to the nearest hundredth.
- Example: $\frac{1}{3}$
- Example: $2\frac{8}{9}$
Below are some typical rod diameters used in stick welding. Convert the diameters to the corresponding decimals.

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{16}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{5}{64}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{3}{32}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{8}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{5}{32}$</td>
<td></td>
</tr>
<tr>
<td>$\frac{3}{16}$</td>
<td></td>
</tr>
</tbody>
</table>

We've already been doing this a bit. However many decimal places there are, we put the number over 10, 100, 1000, ... Then reduce. Or, think about the way you would properly say the decimal. Example: 0.4

Example: 0.65

The following measuring devices are used to measure small lengths very precisely and read out in decimal form:

- **Caliper**
  
  [Link](https://www.wisc-online.com/learn/career-clusters/manufacturing/ma4302/how-to-read-a-caliper)

- **Micrometer**
  
  [Link](https://www.wisc-online.com/Object/ViewObject.aspx?ID=MTL1902)

Try Yourself

1) 0.6875

Example: 0.46875

2) 0.125

Example: 0.375