## Decimals

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## 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

, Examples: Write as a number in fraction form and decimal form

Two hundred seven and thirty-four hundredths

Sixteen thousandths

## 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 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

## 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

, Example: 2.625-1.875
, Example: 35-24.25

## Application Problem - Try Yourself

- You are asked to cut some tubing to be certain lengths. The tolerance is $\pm 0.0625^{\prime \prime}$. List the shortest and longest allowable lengths of the parts.

| Blueprint Length | Lowest Allowable <br> Measurement | Highest Allowable <br> Measurement |
| :---: | :---: | :---: |
| $3.75^{\prime \prime}$ |  |  |
| $11.8125^{\prime \prime}$ |  |  |
| $18.0625^{\prime \prime}$ |  |  |
| $4.375^{\prime \prime}$ |  |  |

## 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: $12.75+6.375+9$


## Application Problem - Try Yourself

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



## Multiplying Decimals

- First calculate the answer by multiplying the decimals in fraction form:

$$
0.3 \times 0.7
$$

## 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

- Complete the following weight and cost list for a project
- There are 12 inches in 1 foot

| Metal <br> Parts | Length <br> of Part <br> (in) | Length <br> of Part <br> (ft) | Weight <br> (pounds <br> per in) | Total <br> Weight | Cost per <br> Ft | Cost per <br> Part |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A | $46.50^{\prime \prime}$ |  | 0.317 |  | $\$ 3.17$ |  |
| B | $12.75^{\prime \prime}$ |  | 0.574 |  | $\$ 8.60$ |  |
| C | $84.00^{\prime \prime}$ |  | 0.250 |  | $\$ 2.12$ |  |
|  |  |  |  | $\mathrm{~W}=\ldots$ |  | $\mathrm{C}=\_$ |

## Converting a Fraction to a Decimal

- Show with repeating notation and round to the nearest hundredth.
, Example: $\frac{1}{3}$
- Example: $2 \frac{8}{9}$


## Application Problem - Try Yourself

- Below are some typical rod diameters used in stick welding. Convert the diameters to the corresponding decimals.

| Fraction | Decimal |
| :---: | :---: |
| $\frac{1}{16} "$ |  |
| $\frac{5}{64} "$ |  |
| $\frac{3}{32} "$ |  |
| $\frac{1}{8} "$ |  |
| $\frac{5}{32} "$ |  |
| $\frac{3}{16} "$ |  |



## Converting a Decimal to a Fraction (Terminating Fractions)

, Example: 0.375
, Example: 0.46875


## Converting a Decimal to a Fraction (Terminating Fractions)

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

Example: 0.65

## Try Yourself

- 1) 0.6875
, 2) 0.125

