



#### **Adding Fractions**

- Does this make sense?  $\frac{1}{4} + \frac{3}{8} = \frac{4}{12} = \frac{1}{3}$
- Represent the problem with a picture. What do we need to do to add these two fractions?

### Adding/Subtracting Fractions (Same Denominator) • Example: $\frac{3}{4} - \frac{1}{4}$

- Example:  $\frac{5}{8} + \frac{7}{8}$
- Try Yourself:  $\frac{7}{32} + \frac{9}{32} + \frac{5}{32}$
- Try Yourself:  $\frac{15}{16} \frac{9}{16}$



#### **Common Denominators**

- As discussed before, in order to add/subtract fractions we need a common denominator (same number on the bottoms of the fractions).
- > To do this we are looking for a number that each of the denominators goes into.
- There can be many common denominators, but if we find the least common denominator (LCD) we can work with smaller numbers and our calculations will be easier.

#### **Common Denominators**

 What are the common denominators for the following sets of denominators?
8, 32



#### Adding/Subtracting Fractions (Different Denominators)

• Example:  $\frac{3}{4} + \frac{5}{6}$ 

1. What is the common denominator:

• 2. What is  $\frac{3}{4}$  written with the com. den.:

What is  $\frac{5}{6}$  written with the com. den.:

 3. Rewrite the problem with the common denominators and add:



## Application Problem

• A part is supposed to have a length of  $\frac{5}{8}$  " once machined. If the tolerance is  $\pm \frac{1}{16}$  ", what are the shortest and longest tolerable lengths they could be?



#### **Try Yourself**

→ 3) A washer has an outer diameter of  $\frac{7}{8}$ ". The wall thickness of the washer is  $\frac{3}{32}$ ". What is the inner diameter?

#### **Adding Mixed Numbers**

- To add mixed numbers, you can always changed the mixed numbers to improper fractions and add as previously shown
- It's often easier to add the whole numbers, add the proper fractions and change any improper fraction to a mixed number and combine.
- Example:  $3\frac{1}{2} + 2\frac{3}{4}$









#### **Application Problem**

• Three parts with lengths of  $2\frac{1}{8}$ ",  $4\frac{3}{16}$ ", and  $\frac{3}{4}$ " are lined up and welded together. What is the total length if  $\frac{1}{16}$ " length should be added for the weld between each part?

## Differences between multiplying and adding fractions

Compare the two problems: What do each look like with a picture before solving?



# Order of Operations and Fractions • Recall: What are the steps to the order of operations? • Example: $\frac{3}{4}\left(\frac{5}{8} - \frac{3}{16}\right) - \frac{7}{32}$

#### **Application Problem**

• The following sizes of piping are needed to be cut. What is the total needed: five pieces of  $2\frac{3}{4}$ ", three pieces of  $1\frac{5}{8}$ ", and eight pieces of  $6\frac{1}{2}$ ".

#### Try Yourself



#### Try Yourself

> 2)You start with a 60" piece of round stock and cut four pieces of  $4\frac{3}{4}$ ". For each piece cut,  $\frac{1}{16}$ " is lost due to cutting. How much of the original piece of round stock is leftover?