Welding: Hibachi Grill Project

Adding and Subtracting Fractions/Decimals

Operations with Fractions:

- Adding or Subtracting: to add or subtract fractions, the fractions must have the same denominator (working with equal size pieces of the whole).
  - Determine the Lowest Common Denominator (LCD) → the smallest number that is divisible by both denominators.
  - Build up both fractions so they have the same denominator.
  - Add or subtract the numerators and put it over the common denominator.
  - Reduce the result if necessary.

$\frac{3}{16}+\frac{5}{8}\rightarrow$ common denominator = 16

$$\frac{3}{16}+\frac{5}{8}=\frac{3}{16}\left(\frac{1}{1}\right)+\frac{5}{8}\left(\frac{2}{2}\right)$$

$$=\frac{3}{16}+\frac{10}{16}=\frac{13}{16}$$

$\frac{3}{5}+\frac{2}{3}\rightarrow$ common denominator = 15

$$\frac{3}{5}+\frac{2}{3}=\frac{3}{5}\left(\frac{3}{3}\right)+\frac{2}{3}\left(\frac{5}{5}\right)$$

$$=\frac{9}{15}+\frac{10}{15}=\frac{19}{15}=1\frac{4}{15}$$

$\frac{5}{6}-\frac{1}{4}\rightarrow$ common denominator = 12

$$\frac{5}{6}-\frac{1}{4}=\frac{5}{6}\left(\frac{2}{2}\right)-\frac{1}{4}\left(\frac{3}{3}\right)$$

$$=\frac{10}{12}-\frac{3}{12}=\frac{7}{12}$$

Application:

If the dimensions for a welded rod is given as 5-8 with a tolerance of +1/8" & - 1/32" what is the total tolerance window?

$$5-8=5ft\ 8in=5'8''$$

First, consider the upper bound of the rod by adding 1/8":

$5'8'' + \frac{1}{8}''$ → add the fraction of tolerance to the inches of measurement:

$$5'8'' + \frac{1}{8}'' \rightarrow$$

$$8'' + \frac{1}{8}'' = \frac{8}{1}'' + \frac{1}{8}''$$

$$= \frac{8}{1}''\left(\frac{8}{8}\right) + \frac{1}{8}''$$

$$= \frac{64}{8}'' + \frac{1}{8}''$$

$$= \frac{65}{8}'' = 8\frac{1}{8}''$$

So the upper bound is $5'\ 8\frac{1}{8}''$

When adding fractions to a whole numbers, especially in applications, the answer is most often written as a *mixed fraction*, in which case the answer could be found by adding 1/8" to the full 8".

Second, consider the lower bound of the rod by subtracting 1/32":

$5'8'' - \frac{1}{32}''$ → subtract the fraction of tolerance from the inches of measurement:

$$5'8'' - \frac{1}{32}'' \rightarrow$$

$$8'' - \frac{1}{32}'' = \frac{8}{1}'' - \frac{1}{32}''$$

$$= \frac{8}{1}''\left(\frac{32}{32}\right) - \frac{1}{32}''$$

$$= \frac{256}{32}'' - \frac{1}{32}''$$

$$= \frac{255}{32}'' = 7\frac{31}{32}''$$

So the lower bound is $5'\ 7\frac{31}{32}''$

When subtracting fractions from whole numbers, especially in applications, the answer is most often written as a *mixed fraction*, in which case the answer could be found by subtracting 1/32" from the full 8", by using borrowing 1" and subtracting.

Perform the following addition and subtraction. Always express fractions in reduced form.

1. $\frac{3}{4}+\frac{3}{4}=$	2. $\frac{5}{16}+\frac{3}{16}=$
3. $\frac{1}{2}-\frac{3}{32}=$	4. $\frac{7}{8}-\frac{3}{4}=$
5. $\frac{31}{32}+\frac{1}{4}=$	6. $3-\frac{5}{16}=$
7. $\frac{2}{3}+\frac{1}{2}=$	8. $\frac{3}{10}-\frac{1}{6}=$
9. $\frac{5}{7}-\frac{1}{3}=$	10. $\frac{2}{9}+\frac{5}{6}=$