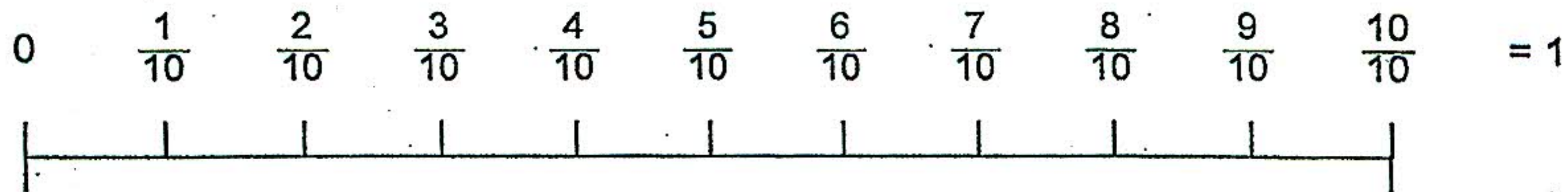


## Welding: Hibachi Grill Construction

### Fractions and Equivalent Decimals

Parts of inches may be stated in fractions ( $\frac{1}{8}$ ",  $\frac{1}{4}$ ",  $\frac{3}{4}$ ") or in decimals 0.125", 0.25", 0.75".

If we divide a line into 10 parts, one part is one part divided by the total parts, or  $\frac{1}{10}$  of the total.



Two parts =  $\frac{2}{10}$ , three parts =  $\frac{3}{10}$ , and so on.

$\frac{10}{10}$  will cancel:  $\frac{10}{10} = \frac{1}{1} = 1$  or the total line.

A *tenth* is written with a decimal point:  $\frac{1}{10} = 0.1$ ,  $\frac{2}{10} = 0.2$ . The first place to the right of a decimal point is called "tenths."

$$0.3 = \frac{3}{10} \quad 0.4 = \frac{4}{10}$$

If one part ( $\frac{1}{10}$ ) is 10 divided into 10 more parts, we have:

$$\frac{1}{10} \div \frac{1}{10} = \frac{1}{10} \times \frac{1}{10} = \frac{1}{100}, \text{ written } 0.01$$

### CHANGE FRACTIONS TO DECIMALS

**Rule:** Divide the numerator by the denominator. The answer will be on the *right* of the decimal point in tenths, hundredths, thousandths, and so on.

Given a fraction, convert into an equivalent decimal representation by dividing the numerator by the denominator:

$$\frac{3}{8} = .375 \text{ since doing the division } 8 \overline{)3.000}$$

$$\begin{array}{r} 0.375 \\ 8 \overline{)3.000} \\ \underline{24} \phantom{00} \\ 60 \phantom{0} \\ \underline{56} \phantom{0} \\ 40 \phantom{0} \\ \underline{40} \\ 0 \end{array}$$

(Division can also be done on a calculator to determine the equivalent decimal.)

There are some fractions in common use whose equivalent decimal representation can be memorized or found in a reference table (the one shown below has the decimal equivalents rounded to 4 places). One obvious example would be the fractions  $\frac{1}{2} = .5$  and  $\frac{1}{4} = .25$ :

The following chart is convenient "tool box" of decimal equivalents (this is a great way to chose the size of a "clearance drill" if you recall we used  $\frac{7}{64}$  or  $\frac{9}{32}$  drill bit for the  $\frac{1}{4} \times 20$  bolt on the vent pivot.

Decimal Equivalents of Fractions													
Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal
1/64	.0156	19/64	.2969	37/64	.5781	55/64	.8594						
1/32	.0313	5/16	.3125	19/32	.5938	7/8	.8750						
3/64	.0469	21/64	.3281	39/64	.6094	57/64	.8906						
1/16	.0625	11/32	.3438	5/8	.6250	29/32	.9063						
5/64	.0781	23/64	.3594	41/64	.6406	59/64	.9219						
3/32	.0938	3/8	.3750	21/32	.6563	15/16	.9375						
7/64	.1094	25/64	.3906	43/64	.6719	61/64	.9531						
1/8	.1250	13/32	.4063	11/16	.6875	31/32	.9688						
9/64	.1406	27/64	.4219	45/64	.7031	63/64	.9844						

Numbers with both a whole number part and a fractional part are called *mixed fractions*:

$$2\frac{1}{4} = 2.25$$

2 represents the number of whole parts and

$\frac{1}{4} = .25$  is the fractional part and falls after the decimal place.

An *improper fraction* is a fraction that could be expressed as a mixed fraction but has been left with the numerator larger than the denominator:

$$\frac{9}{4}$$

Notice this fraction could have been expressed as the mixed fraction above  $2\frac{1}{4}$ , because 4 goes into 9 twice

with a remainder of 1, or 1 out of 4  $\left(\frac{1}{4}\right)$  left over.

**Rule:** To add or subtract decimals, place the numbers so that the decimal points are lined up one under the other, then add or subtract as you would whole numbers.

$\begin{array}{r} 3.25 \\ - 0.07 \\ \hline 3.18 \end{array}$	$\begin{array}{r} 2.789 \\ - 1.876 \\ \hline 0.913 \end{array}$	$\begin{array}{r} 25.1 \\ - 12.0 \\ \hline 13.1 \end{array}$	$\begin{array}{r} 42.630 \\ + 18.275 \\ \hline 60.905 \end{array}$	$\begin{array}{r} 98.000 \\ + 21.811 \\ \hline 119.811 \end{array}$
--	---	--	--	---

**Note:** When the numbers behind the decimal point are uneven, add zeros to reduce the chances of error.

When borrowing from whole numbers becomes necessary it may be accomplished in the following manner:

$$\begin{array}{r} 98. \\ - 21.811 \\ \hline \end{array} = \begin{array}{r} 98.000 \\ - 21.811 \\ \hline \end{array} = \begin{array}{r} \phantom{9}8\phantom{.}000 \\ \phantom{9}8\phantom{.}000 \\ - 21.811 \\ \hline 76.189 \end{array}$$

**Add or subtract the following fractions using the decimal equivalent chart:**

2.  $\frac{1}{4} + \frac{5}{8} =$

3.  $1\frac{1}{8} + 2\frac{7}{16} =$

4.  $6\frac{11}{16} - 5\frac{1}{8} =$

5.  $12\frac{13}{16} - 1\frac{1}{32} =$

The multiplication of decimals is used to find the total length, width, or height of materials for specific jobs. If the length is in decimals and we have a certain number of materials, we can arrive at their overall length, width, or height by simple multiplication of the decimals.

**Example:** A piece of angle iron 15.685 inches long is needed 13 times on a frame repair job. How many inches of angle iron must be available for the job?

$\begin{array}{r} 15.685 \\ \times \phantom{0}13 \\ \hline 47055 \\ 15685 \\ \hline 203.905 \end{array}$	(3 decimal places) (0 decimal places)  (3 decimal places in answer)
$\begin{array}{r} \phantom{15}685 \\ \phantom{15}685 \\ \phantom{15}685 \\ \hline 321 \end{array}$	(Start counting places from right side.)

**Remember:** The number of decimal places is counted in the multiplicand and multiplier, then added. This determines the number of decimal places that are in the product (answer).

$\begin{array}{r} 6.875 \\ \times 0.501 \\ \hline 6875 \\ 343750 \\ \hline 3.444375 \end{array}$	(3 decimal places) (3 decimal places)  (6 decimal places)
$\begin{array}{r} \phantom{6}875 \\ \phantom{6}875 \\ \phantom{6}875 \\ \phantom{6}875 \\ \phantom{6}875 \\ \phantom{6}875 \\ \hline 654321 \end{array}$	

