Fractions and Decimals

Landscape Construction

Fractions are used quite a bit in landscape construction. Often the measurements are not whole numbers (2 inches, 3 inches, etc.). A landscaper might measure a piece of wood that is 3 3/8" long. They need to know how to work with this number.

Example:

You have two pieces of wood.

One measures 4 3/4" long and the other is 3 3/8" long.

If the landscaper wants you to find the total measurement of the two pieces of wood, they need to be able to add them together. Some tape measures come with fractions written on the tape but knowing how to add and subtract fractions is a useful skill on any construction project.

Adding Fractions

Look at the fraction below:

1/2

The top number (1) is called the **numerator**. The bottom number (2) is called the **denominator**. This is true whether the fraction is written with a horizontal line ($\frac{1}{2}$) or with a slanted line (½).

It is fairly easy to add two fractions that have the **same denominator**. For example,

What is $\frac{1}{4} + \frac{2}{4}$?

If you got $\frac{3}{4}$, you are correct. To add two fractions with the same denominator, just add the two numerators together (1+2). So, $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$

However, the denominators are not always the same so let's go back to our previous example (measuring two pieces of wood), where the boards measured $4\frac{3}{4}$" and $3\frac{3}{8}$".

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Notice that the two denominators are **not** the same. If your boss asked you to add the two measurements together, you would have to do the following:

1. First, let's put the whole numbers aside for the moment (4 and 3) and just consider the fractions.

$$\frac{3}{4} + \frac{3}{8} =$$

We can't simply add the two numerators together (3+3), because this time the denominators are different. The two divided lines below will help us to visualize this problem.

A)

B)

Line A represents $\frac{3}{4}$. Line B represents $\frac{3}{8}$. Do you notice anything?

From the above, you can see that $\frac{3}{4}$ is the same length as $\frac{6}{8}$. We can add $\frac{6}{8} + \frac{3}{8}$ because they both have the same denominator. But how do we get this by looking at the numbers alone? What do the numbers 4 and 8 have in common?

Answer: 4 × 2 = 8. Since you can get 8 by multiplying 4 by 2, you can add these fractions by converting them from fourths to eighths.

2. To do this, we multiply the numerator and denominator by 2. This will allow the two fractions to be added because they have the **same** denominator. (Since $\frac{2}{2} = 1$, we are not changing the value of $\frac{3}{4}$).

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$

3. Therefore, the first board measures $4\frac{6}{8}$" and the other board measures $3\frac{3}{8}$".

4. To add the measurements of the two boards, add the whole numbers first.

$$\mathbf{4}\frac{6}{8} + \mathbf{3}\frac{3}{8}$$

$$4 + 3 = 7$$

5. Next, add the numerators. (**Do not add the denominators**)

$$\frac{6}{8} + \frac{3}{8} = \frac{9}{8}$$

6. The two boards measure $7\frac{9}{8}$" in total.

7. How many 8ths are in a whole inch? If you look at the divided line B), you can see that if the whole line were shaded in, you would have $\frac{8}{8}$". Whenever the numerator is larger than the denominator, you need to reduce the fraction to a whole number plus a fraction (or a **mixed number**). In order to do this, divide the numerator by the denominator.

In this case, if you divide 9 by 8, you get 1 and some left over. The leftover, in this case, is 1. This leftover is the new **numerator** and is put over the denominator.

$$\frac{9}{8} = \mathbf{1}\frac{1}{8}$$

Answer: The two boards measure (7"+ 1") + $\frac{1}{8}$" = $8\frac{1}{8}$"

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Subtracting Fractions

Subtracting fractions follows the same rules as adding fractions. Let's look at our two boards again. One board measures $4\frac{3}{4}$" and the other is $3\frac{3}{8}$"

Your boss wants both boards to be cut to a length of $3\frac{3}{8}$"

How much must you cut from the longer board? Follow the same steps that you used to add the fractions together, but now subtract the fractions.

$\frac{3}{4} - \frac{3}{8} =$

1. Once again, the fractions must have the same **denominato**r. Look at the two denominators (4 and 8). Do they have something in common?

In this case, 4 × 2 = 8.

2. Multiply the numerator and denominator in the fraction $\frac{3}{4}$ by 2. This will allow the two fractions to be subtracted because they will then have the **same** denominator.

$$\frac{3}{4} \times \frac{2}{2} = 6/8$$

3. Therefore, the longer board measures $4\frac{6}{8}$ and the other board measures $3\frac{3}{8}$.

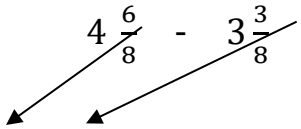
4. Subtract the measurements of the two boards. Subtract the whole numbers **first**.

$$4\frac{6}{8} - 3\frac{3}{8}$$

4 – 3 = _____**1**_____

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

5. Next, **subtract** the numerators. (**Do not subtract the denominators. The denominators will stay the same**)



6 – 3 = _____3_____

So $\frac{6}{8}$ **-** $\frac{3}{8}$ **=** $\frac{3}{8}$

So, if your boss wants both boards to be equal, you will need to cut ⅜" off the longer board.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.

Converting Fractions and Decimals

Sometimes you will have to convert (or change) decimals to fractions or fractions to decimals. Some common conversions that are used in construction are found in the following table. These measures are used often, and you should memorize them.

Common Conversion Table	
Fraction	**Decimal**
1/16	**.0625**
1/8	**.125**
1/4	**.25**
1/2	**.5**

Suppose you were asked to convert $\frac{3}{8}$" to a decimal. You know $\frac{1}{8}$ is the same as 0.125.

To convert $\frac{3}{8}$, you multiply .125 by 3.

.125 × 3 = .375

$\frac{3}{8}$" is the same as .375"

On the next page you will find a learning activity to help you practice the information you just learned.

This Employment Ontario program is funded in part by the Government of Canada and the Government of Ontario.