

# BLC150–Algebra Workshop

## Homework 11- Measurement Conversions

Name:

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### CONVERTING FROM ONE MEASUREMENT SYSTEM TO ANOTHER.

[Note: 3' is 3 feet. 3" is 3 inches.]

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Let's convert from feet to inches and vice versa, using algebra.

First, just write what you know for sure.

*1 foot equals 12 inches.*

$$1' = 12''. \text{ [Eq. 1]}$$

Now play around with this equation. How many inches in 4 feet?

Just do some algebra....

Multiply both sides by 4 to get from 1' to 4' and figure it out.

$$4 \times 1' = 4 \times 12''$$

$$4' = 48''.$$

Four feet is fortyeight inches.

That's how you convert from feet to inches.

Converting the other way, from inches to feet, is a bit trickier.

Again, we know that

$$12'' = 1'.$$

How much of a foot is 1 inch?

To figure this out divide both sides by 12.

$$\frac{12''}{12} = \frac{1'}{12}$$

This simplifies to

$$1'' = \frac{1}{12}ft. \text{ * [Eq. 2]}$$

One inch is one twelfth of a foot.  
Makes sense when you think about it.

So, if you have 24", how many feet do you have?

Enter algebra....

Multiply both sides by 24. Why? Because you don't have one inch like Equation 2 states, you have 24 inches. That's 24 times bigger than one inch.

$$1'' = \frac{1}{12}ft$$

$$24 \cdot 1'' = 24 \cdot \frac{1}{12}ft.$$

$$24'' = \frac{24}{12}ft.$$

$$24'' = 2'. \text{ Ta-Da!}$$

But you probably knew that already.

Alright, smartypants, how many feet is 68"?

Start with what you know:

$$1'' = \frac{1}{12}ft$$

Now multiply both sides by 68...

$$68 \cdot 1'' = 68 \cdot \frac{1}{12}ft.$$

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\* You might have noticed that I switched notations from 1' to 1ft. I only did this to keep things clear. 1' is clear. But 1'/12 is getting messy, so I switched to "ft."

$$68'' = \frac{68}{12} ft.$$

My calculator says...

$$\cong 5.67'$$

68'' is about 5.67'. [5 and 2/3 feet]

So if you know this:

$$1' = 12''$$

you can deduce this:

$$1'' = \frac{1}{12} ft.$$

And from these you can convert anything from feet to inches or from inches to feet.

Fill in this table.

<u>inches</u>	<u>feet</u>
60''	5'
36''	
72''	6'
	10'
	1.5'
18''	
120''	
	50'
108''	

Now try another conversion. This time from feet to miles.

There are 5280 ft in a mile. You need to figure out how many miles is 1 foot. Do some algebra.

$$5280 \text{ ft} = 1 \text{ mile} \quad \dots \text{ so } \dots \quad 1 \text{ ft} = \quad \text{miles}$$

How many feet is 5 miles?
How many miles is 10,560 feet?
How many miles is 13,200 feet?
How many miles if 528 feet?
How many feet is 2 tenths of a mile?
How many feet is 100 miles?

You do conversions in your head all the time. Like with time: minutes, hours, days, weeks, months, years. All of us do these all the time. Jumping from proximate scales is not so hard. E.g. minutes to hours or days to weeks. But skipping scales is harder. E.g. hours to months or days to years. So lets do a few. Start with what you know. Then deduce the other conversion direction.

	Fill in the missing conversions
60 seconds = 1 minute	1 second = $\frac{1}{60}$ minutes
60 minutes = 1 hour	
24 hours = 1 day	
7 days = 1 week	
365.25 days = 1 year	1 day = $\frac{1}{365.25}$ years
100 years = 1 century	
1000 years = 1 millennium	

Answer the following questions. [You might have to look up a few terms.]

1. How minutes in a day?	
2. How many minutes in a year?	
3. How many seconds in 30 days?	
4. How many minutes in a typical lifetime?	
5. How many centuries is 350 years?	
6. How many hours in a generation?	

Other conversions are a bit messier.

$$1 \text{ meter} \cong 3.28 \text{ feet.}$$

1. How many meters is 1 foot?
2. How many feet is 2 meters?
3. How many meters is 328 feet?

4. How many <u>feet</u> is 91.46 meters?
5. How many <u>yards</u> is 91.46 meters?
6. How many meters is 5280 feet?

You know that 1 meter is 3.28 feet. You also know (I hope) that 1 kilometer is 1000 meters. How many feet in a kilometer?



You measure the distance from Cleveland to New York City on a map. It is 10 centimeters. You know for a fact that NYC to Cleveland is 400 miles.

- On this map, how many miles is 1 centimeter?
- The distance from NYC to LA is 62.5 cm on this map. How far is LA in miles?
- You know that New Mexico is 340 miles wide. How big will that be on this map?