Name: _____

Homework 3- Measurement Conversions

CONVERTING FROM ONE MEASUREMENT SYSTEM TO ANOTHER.

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

Work in pairs or triplets and convert the following:

1	12 inches =	foot		5	1 day =	hours
2	6 feet =	yards		6	14 days =	weeks
3	200 cm =	meters		7	365.25 days =	year
4	120 minutes =	hours		8	3 teaspoons =	tablespoon

Those were easy. Nice, well-behaved results. You can do all the math in your head. Now do these:

9	18 inches =	feet		12	175 minutes =	hours
10	7 feet =	yards		13	2.25 days =	hours
11	7920 feet =	miles		14	19 teaspoons =	tablespoons

Things got trickier. No? Now do these:

15	2 inches =	feet		18	920 minutes =	hours
16	8' 3" =	yards		19	1 day 8 hours =	minutes
17	48 cm =	meters		20	$14 =	cents

Most of us have an intuitive sense about doing conversions. We multiply or divide by some number that seems right... 60 when dealing with minutes and hours, or 12 when dealing with inches and feet. When using the metric system we move decimal points around and count zeros... and we know the right answer when we see it.

There is a more systematic way to do this. Actually there are two ways that we'll do. They are both the same mathematically, but you may prefer one way over the other. I certainly have a preference.

Let's say you need to convert minutes to seconds.

How many seconds is 18.25 minutes.

Simply write down what you know about seconds and minutes as an equation.

1 minute = 60 seconds

You want 18.25 minutes...

...so multiply both sides by 18.25.

18.25 minutes = 18.25(60) seconds

[calculator please....]

18.25 minutes = 1095 seconds.

Now let's say you want to know how many minutes is 1095 seconds. Write down what you know.

1 minute = 60 seconds

This time it's hard to see how to proceed. You can't multiply both sides by 1095. That will result in 1095 minutes and 65,700 seconds. So do this... make 60 seconds into 1 second by dividing both sides by 60. Now you know how many minutes is 1 second. One second is one sixtieth of a minute.

$$\frac{1}{60} minute = 1 \ second$$

Now multiply both sides by 1095.

$$\frac{1095}{60} minute = 1095 \ seconds$$

[calculator please...]

18.25 minutes = 1095 seconds

This method works for any conversion for which you know the single-serving formula.

Convert these to their reciprocal. I've done one to show you what I mean

1.	1 foot = 12"	$\frac{1}{12}foot = 1 \ inch$	Divide both sides by 12.
2.	1 yard = 3 feet		Divide both sides by 3.
3.	60 min. = 1 hour		Divide both sides by 60
4.	1 tbs = 3 tsp		Divide both sides by ...
5.	100 cm = 1 m		Divide both sides by ...
6.	1 inch = 2.54 cm		Divide both sides by...

You have now made a pair of formulae for each conversion.

E.g. From inches to centimeters or from centimeters to inches.

Using the formulae you just figured out (above), convert the following. Use a calculator if you need to.

1	8.5 inches =	cm	4	38.5 minutes =	hours
2	$3.\overline{33}$ yards =	feet	5	1 week 8 hours =	minutes
3	12 cm =	inches	6	123.44 cm	meters

The other way to do conversions is in some ways quicker, but it is less intuitive.

Put what you know into a fraction, and then make that equal to what you don't know... like this.

How many feet is 30 inches?

|	
I know that there are *twelve inches per foot:*	$\frac{12in}{1ft}$
Set **that** equal to 30" per x feet.	$\frac{12in}{1ft} = \frac{30in}{xft}$
Cross-multiply to get...	$12x = 30$
Isolate your x by dividing both sides by 12.	$\frac{12x}{12} = \frac{30}{12}$
And you get...	$x = 2.5$
30 inches is 2.5 feet.	

The only thing you have to remember to do here is match units on each side of the equation. In this case, put inches in the numerator and feet in the denominator.

Given: 1 meter is 3.28 feet   and   1 kilometer is 1000 meters.

How many feet in a kilometer?

To summarize... All you need to know to do most conversions is a simple formula like

1" = 2.54 cm   or $1 = €0.875   or   1 mile = 5280'
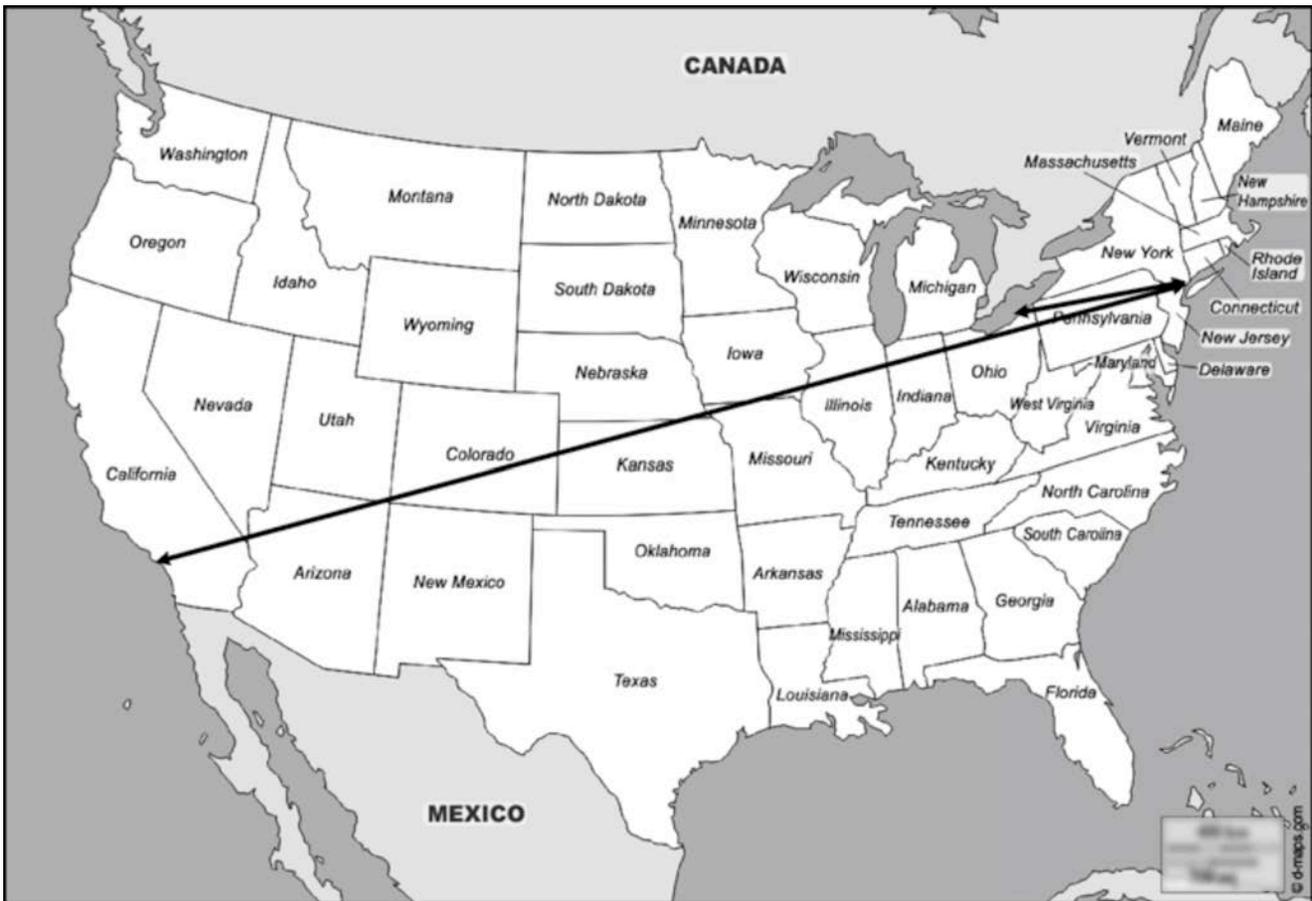
You measure the distance from Cleveland to New York City on a map.
It is exactly 10 centimeters. You know for a fact that NYC to Cleveland is 400 miles as the crow flies.

a. On this map, how many miles is 1 centimeter?   10cm = 400 miles.

b. The distance from NYC to LA is 62.5 cm on this map. How far is LA in miles?

c. You know that New Mexico is 340 miles wide. How big will that be on this map?

d. Annandale to Canal St. in Manhattan is exactly 90 miles as the crow flies. How many centimeters on this map?

e. What is 1 mile on this map, measured in centimeters?

f. The Florida panhandle is 370 miles wide. How many centimeters on this map?

Currency conversions. [as of 2/7/19]

Convert back and forth... *from* dollars and *to* dollars. Fill in the missing exchange rates.
I did a few to show you what I want.
Notice that with currency the symbol usually goes before the number,
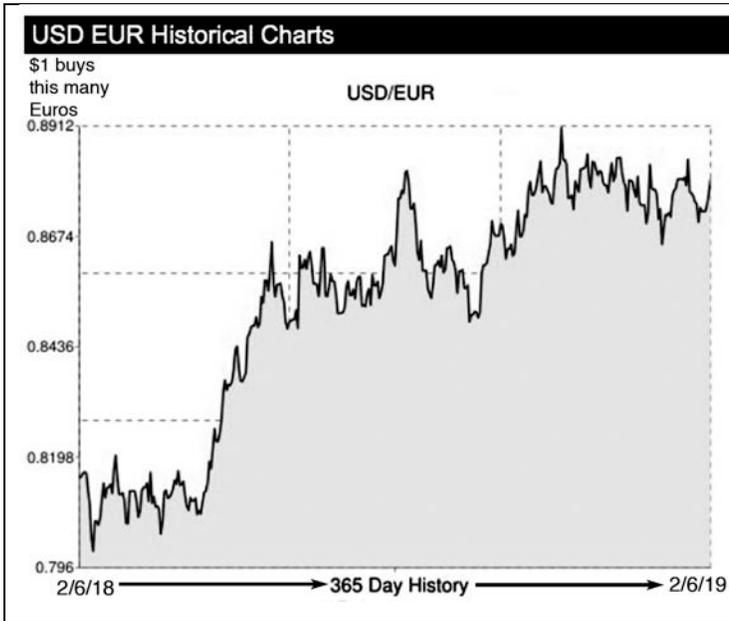not after it, like most other measurements. I don't know why.
Please don't use a currency converter program. Do the math. It's just as easy.
Simply take what you have and throw it in the denominator. E.g. $1.00 = €0.88. Just divide both sides by 0.88.

	Currency Symbol	From 1 unit of foreign currency to US$	From 1 US$ to foreign currency
1	€ is Euros	€1.00 = **$1.14**	$1.00 = €0.88
2	฿ is Bitcoin	฿1.00 = $3360.00	$1.00 =
3	*Can*$ is Canadian Dollars	*Can*$1.00 = $0.75	$1.00 =
4	£ is British Pounds Sterling	£1.00 =	$1.00 = £0.77
5	¥ is Chinese Yuan Renminbi	¥1.00 =	$1.00 = ¥6.74
6	¥ is Japanese Yen	¥1.00 = $0.0091	$1.00 =
7	*BsF.* (bolívar fuerte) is the Venezuelan currency	1.00 BsF. =	$1.00 = 248,521 BsF.
8	*Rp* is Indonesian Rupiah	Rp 1.00 =	$1.00 = Rp13,987
9	*CHF* is Swiss Franc	CHF 1.00 = $1.00	$1.00 =
10	ريال is Yemen Rial	ريال1.00 = $0.004	$1.00 =

Using your conversions from the chart above, figure out the following...

11	How many BsF can you buy for 25 dollars?	
12	How many dollars will you spend to buy 85 Chinese Yuan?	
13	How many US$ are your Can$100 worth?	
14	How many Bitcoin can you buy for $1000?	
15	How many US$ are 15,000 Yemen Rial worth?	

USD EUR Historical Charts
$1 buys this many Euros

USD/EUR

0.8912

0.8674

0.8436

0.8198

0.796

2/6/18 — 365 Day History — 2/6/19

To the left is a graph of the $/€ exchange rates over the past year. Given what you see in this graph, do you think that it is a good time to buy Euros? Explain your answer.

Convert to addition and then solve. See example.

E.g.	$4 - 6 + 5 - 2 =$ $4 + (-6) + 5 + (-2) = 1$	4	$\$13 + \$12 - \$25 + \$4 =$
1	$3 - 3 + 1 =$	5	$10 - (3 + 2) + (2 + 3) - 5 =$
2	$18 - 19 + 3 =$	6	$3 - (3 - 2) + 4 =$
3	$3x + 5x - 8x + 3x =$	7	$12(3 - 2) - 5 =$

Solve for *y* and simplify as far as you can.

8	$y = 3x + 7 - 8$
9	$y = 7x - 9x + 6$
10	$2y + 1 = 4y - 3x + 1$
11	$\dfrac{y}{x} = 3$
12	$\dfrac{y^2}{x} = 3y$
13	$\dfrac{y}{x} = 2 + \dfrac{7}{x}$

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