* = those problems covered in class.

		-			
Metr	IC (.on	iver	ารโด	ns

Practice Using the Factor-label Method



If a car is going down the highway at a rate of 95 km/h, how fast is this in m/s?

(95 Km)	(In \	/1000m/		
	3600s) = d(om·s
	,	C 11.		

Factor-Label Method for Conversions

- When converting from one unit to another . (i.e. kg → g, or feet → meters), we use Conversion Factors
- Conversion factors tell us the equivalent magnitude in the new unit
 - For example:
 - 1 in. = 2.54 cm
 - 1 lb = 454 g
 - 1 kg = 2.2 lb

 When converting, we make fractions (ratios) out of the conversion factors so that the original unit divides out (cancels out) and the new unit-remains:

Factor-Label Method for Conversions

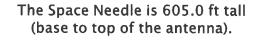
- Example:
- 2.75 pounds is equal to how many kilograms?

$$\left(\frac{2.75 \text{ lb}}{2.2 \text{ lb}}\right) \left(\frac{1 \text{ kg}}{2.2 \text{ lb}}\right) = 1.25 \text{ kg}$$

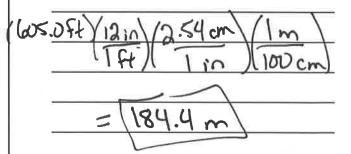
Common Conversion Factors

(You will NOT need to memorize these!)

1 gallon (gal) = 3.785 L 1 gal = 8 pints



→ How many meters is this? $ft \rightarrow in \rightarrow cm \rightarrow m$



According to the Guinness Book of World Records (GWR, 2008), a man from London balanced a 352 lb car (a Mini) on his head for 33 seconds.

What is the mass of this car in kilograms?

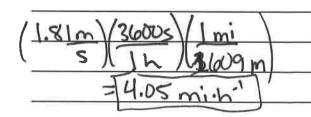
352 16	1/1/0	/_	WA	1/
300.00			160.	Kg
	12.20	b)		-67

A cheetah can run at speeds up to 70.0 miles per hour. How fast is this in meters per second?

10 mi /1609 m) (1 h) = 31.3 m/s

Michael Phelps holds the Olympic Record for the 200m butterfly from his race at the Beijing Olympics with a time of 1 min, 50.53 s. His average speed was 1.81 meters/second.

• How fast was he swimming in miles per hour?



3

The world record for the Men's 100m sprint, 9.58 seconds, was set by Usain Bolt of Jamaica in 2009. This means he was running at an average speed of 10.44 m/s.

https://www.youtube.com/watch?v=3nbjhpcZ9_g 2 3 3 52-5

- a) How fast was Usain Bolt running in km/hr? Car of the
- ы How fast was he running in mi/hr?

(10.44m)	/Ikm >	136005	-27.5x km
5)	1000m	ITh)	=31.38

A Lotus Elise r reportedly can accelerate from $0 \rightarrow 60 \text{ mi/h in}$ under 5 seconds! Assume its .acceleration is 43,200 mi/hr2 (miles per hour squared),..

What is its acceleration in m/s²?

43200 mi

The largest single ruby (GWR, 2009), has dimensions of 12.20

What is the volume of this ruby in Liters (L)?

How does this compare to a 2-Liter bottles of pop? (which is bigger, and how many times blgger?)

in. x 6.49 in. x 5.51 in.





The Georgia Aquarium in Atlanta has
the largest amount of water volume
of all the world's aquariums (GWR,
2007). It has a total of 63.99 million
pints of water in its tanks.

How many cubic meters is this equivalent to?

(63.99 ×106 pint)	I gal /3	.785L\	1000 cm	/m/3
	8 pint 1	1 gal	* .	(100cm)
2112 -1011	20	0	3	

7

The gas tank of a Subaru Forester can hold 15.9 gal.

· How many Liters of gas is this?

(15.9 gas) (3.7851) - (61)-2 L

Gas mileage for a Toyota Corolla can be 38 mpg (miles per gallon).

What is its gas mileage in kilometers per Liter?

38 mi)	1100	0 1/1.6	09 Km
gal.	3.78	5L) T	mi)
= 110	. 15	× 110	Km/L

Gas costs \$3.60/gallon here.
Gas cost \$1.41/Liter in Canada
this year (costs have already
been converted to US\$).
Who pays more for a gallon of gas, and
how much more?

Canada Days \$1.74 more per gallon

