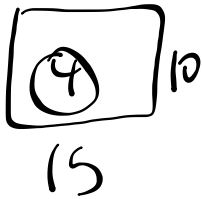
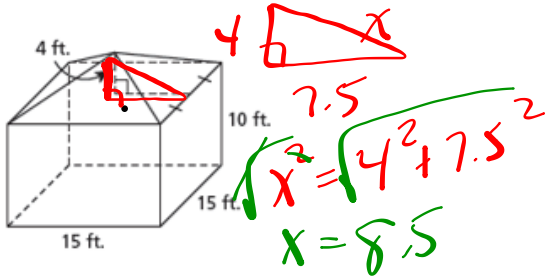


# HOMWORK Questions...

#2. Here are two different grain storage bins.

Each storage bin has a cement base.  
 The materials for the walls and roof of the square-based bin cost \$10.49 per square foot.  
 The materials for the walls and roof of the circular-based bin cost \$9.25 per square foot.  
 Which bin is cheaper to build? Justify your answer.



$$A = 4(15 \times 10)$$

$$A = 600$$



$$A = \frac{1}{2}(15 \times 8.5)$$

$$A = 255$$

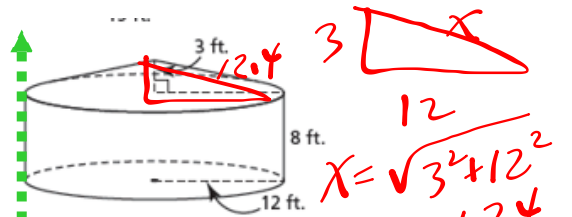
$$SA_{total} = 600 + 255$$

$$= 855 \text{ ft}^2$$

$$\text{Cost} = 855 \times \$10.49$$

$$= \$8968.95$$

Cheaper



$$SA_{cylinder} = 2\pi r^2 + 2\pi rh$$

$$= 2\pi(12)(8)$$

$$= 603.2$$

$$A_{cone} = \pi r^2 + \pi r l$$

$$= \pi(12)(12.4)$$

$$= 466.3$$

$$SA_{total} = 603.2 + 466.3$$

$$= 1069.5$$

$$\text{Cost} = 1070 \times 9.25$$

$$= \$9897.50$$

## 4.4 - Volume



*Volume* is the amount of space an object occupies. It is measured in cubic units.

*Capacity* is the amount of material a container holds. It is measured in cubic units or capacity units.

### PROBLEMS... Different systems:

US and British units of volume are different. A US pint contains 16 US fl oz, while a British pint contains 20 British fl oz. US gallons and British gallons are also different: a US gallon equals 3.785 L, while a British gallon equals 4.54609 L.

Students can discuss the fact that an imperial cup is 284.13 mL; a metric cup is 250 mL in Canada, Australia, and New Zealand; a US legal cup is 240 mL; and a Japanese cup is 200 mL. Students can then create an international table of conversions to see what the recipe would look like in a different country.

## ACTIVITY 4.9 CONVERTING A RECIPE

*Lu'sknikn* is a traditional Mi'kmaq bread that is served at community feasts and celebrations. You have found the following *lu'sknikn* recipe that you would like to make, but the measurements are all in imperial units and you only have SI measuring equipment.

- Examine your teaspoon and measuring cup. What SI and imperial markings are on them? Use the two items and work with a partner to convert the following recipe.

<b>LU'SKNIKN RECIPE</b>		
<i>Imperial</i>	<i>Ingredients</i>	<i>SI</i>
4 cups	flour	1000 mL or 1 L
1 teaspoon	baking powder	5 mL
$\frac{3}{4}$ teaspoon	salt	3.75 mL
$\frac{1}{2}$ cup	shortening	125 mL
3 cups	water	750 mL
$\frac{3}{4}$ cup	molasses	187.5 mL

<b>LU'SKNIKN RECIPE</b>		
<i>Imperial</i>	<i>Ingredients</i>	<i>SI</i>
4 cups	flour	1000 mL or 1 L
1 teaspoon	baking powder	5 mL
$\frac{3}{4}$ teaspoon	salt	3.75 mL
$\frac{1}{2}$ cup	shortening	125 mL
3 cups	water	750 mL
$\frac{3}{4}$ cup	molasses	187.5 mL

- Copy the table below in your notebook and fill in the missing information to create a conversion chart.

British

<b>CONVERTING COMMON COOKING UNITS</b>	
<i>Imperial</i>	<i>SI</i>
$\frac{1}{4}$ teaspoon	___ mL
$\frac{1}{2}$ teaspoon	___ mL
1 teaspoon	___ mL
1 tablespoon (3 teaspoons)	___ mL
1 cup	___ mL
1 pint	568.2614 mL
1 quart (2 pt)	1.1365 L
1 gallon (4 qt)	4.5461 L

<b>CONVERTING COMMON COOKING UNITS</b>	
<i>Imperial</i>	<i>SI</i>
$\frac{1}{4}$ teaspoon	1.25 mL
$\frac{1}{2}$ teaspoon	2.5 mL
1 teaspoon	5 mL
1 tablespoon (3 teaspoons)	15 mL
1 cup	250 mL
1 pint	568.2614 mL
1 quart (2 pt)	1.1365 L
1 gallon (4 qt)	4.5461 L

**FIGURE 4.2**

**Imperial Units of Volume and Capacity**

<i>Unit</i>	<i>Abbreviation</i>
ounce	oz
fluid ounce	fl oz
pint	pt
quart	qt
gallon	gal

**SI Units of Volume and Capacity**

<i>Unit</i>	<i>Abbreviation</i>
liter	L
cubic meter	m <sup>3</sup>

**TABLE 1.5 Selected Prefixes Used in the Metric System**

<b>Prefix</b>	<b>Abbreviation</b>	<b>Meaning</b>	<b>Example</b>
Giga	G	10 <sup>9</sup>	1 gigameter (Gm) = 1 × 10 <sup>9</sup> m
Mega	M	10 <sup>6</sup>	1 megameter (Mm) = 1 × 10 <sup>6</sup> m
Kilo	k	10 <sup>3</sup>	1 kilometer (km) = 1 × 10 <sup>3</sup> m
Deci	d	10 <sup>-1</sup>	1 decimeter (dm) = 0.1 m
Centi	c	10 <sup>-2</sup>	1 centimeter (cm) = 0.01 m
Milli	m	10 <sup>-3</sup>	1 millimeter (mm) = 0.001 m
Micro	μ <sup>a</sup>	10 <sup>-6</sup>	1 micrometer (μm) = 1 × 10 <sup>-6</sup> m
Nano	n	10 <sup>-9</sup>	1 nanometer (nm) = 1 × 10 <sup>-9</sup> m
Pico	p	10 <sup>-12</sup>	1 picometer (pm) = 1 × 10 <sup>-12</sup> m
Femto	f	10 <sup>-15</sup>	1 femtometer (fm) = 1 × 10 <sup>-15</sup> m

<sup>a</sup>This is the Greek letter mu (pronounced "mew").

## Conversions in Capacity: SI vs Metric

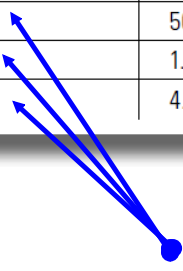
**CONVERTING COMMON COOKING UNITS**

<i>Imperial</i>	<i>SI</i>
¼ teaspoon	1.25 mL
½ teaspoon	2.5 mL
1 teaspoon	5 mL
1 tablespoon (3 teaspoons)	15 mL
1 cup	250 mL
1 pint	568.2614 mL
1 quart (2 pt)	1.1365 L
1 gallon (4 qt)	4.5461 L

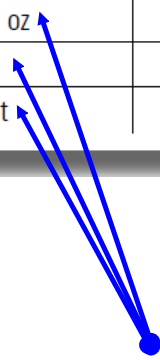
**CONVERTING US IMPERIAL TO SI UNITS**

<i>US Imperial</i>	<i>SI</i>
1 fl oz	29.5735 mL
1 pt = 16 fl oz	473.176 mL or 0.473 L
1 qt = 2 pt	946.352 mL or 0.946 L
1 gal = 4 qt	3785.4 mL or 3.785 L

**NOTE:** 1 L = 1000 mL  
 1 kL = 1000 L  
 1 cm<sup>3</sup> = 1 mL



British



US

FORMULA/TABLE Sheet???

**GMF 10 – Conversions & Formulas for Chapter 4**

**IMPORTANT CONVERSIONS...**

SI Length		Imperial Length	
1 cm = 10 mm 1 m. = 100 cm 1 km = 1000 m	1 m = 1.0936 yd 1 mi. = 1.6093 km 1 in. = 2.54 cm	1 ft. = 12 in. 1 yd = 3 ft. 1 mi. = 1760 yd	<b>SI Capacity:</b> 1 L = 1000 mL 1 kL = 1000 L <b>SI Volume:</b> 1 cm <sup>3</sup> = 1 mL

**CONVERTING COMMON COOKING UNITS**

<i>Imperial</i>	<i>SI</i>
¼ teaspoon	1.25 mL
½ teaspoon	2.5 mL
1 teaspoon	5 mL
1 tablespoon (3 teaspoons)	15 mL
1 cup	250 mL
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**CONVERTING US IMPERIAL TO SI UNITS**

<i>US Imperial</i>	<i>SI</i>
1 fl oz	29.5735 mL
1 pt = 16 fl oz	473.176 mL or 0.473 L
1 qt = 2 pt	946.352 mL or 0.946 L
1 gal = 4 qt	3785.4 mL or 3.785 L

**IMPORTANT SURFACE AREA FORMULAS...**

$SA_{prism} = \text{Add area of all the faces}$

$SA_{cylinder} = 2\pi r^2 + 2\pi rh$

$SA_{cone} = \pi r^2 + \pi rs$

$SA_{pyramid} = A_{base} + (\text{area of the triangular faces})$

**IMPORTANT VOLUME FORMULAS...**

$V_{prism} = lwh$

$V_{cylinder} = \pi r^2 h$

**EXAMPLES:** Fill in the blanks...

a) 16 cups = 4 liters

a)  $4L \times \frac{1000 \text{ mL}}{1} \times \frac{1 \text{ cups}}{250 \text{ mL}}$

b) 8 tablespoons = 120 milliliters

b)  $8 \text{ tbsp} \times \frac{15 \text{ mL}}{1 \text{ tbsp}}$

c) 6 US quarts = 5.7 liters

c)  $6 \text{ US qt} \times \frac{0.946 \text{ L}}{1 \text{ US qt}}$

d) 16 tsp = 5 1/3 tbsp

$16 \text{ tsp} \times \frac{1 \text{ tbsp}}{3 \text{ tsp}}$

e) 22.7 cups = 12 US pints

f) 10 fl oz = 1.2 cup

e)  $12 \text{ US pts} \times \frac{473.176 \text{ mL}}{1 \text{ US pts}} \times \frac{1 \text{ cups}}{250 \text{ mL}}$

f)  $10 \text{ fl oz} \times \frac{29.5735 \text{ mL}}{1 \text{ fl oz}} \times \frac{1 \text{ cup}}{250 \text{ mL}} = 22.7 \text{ cups}$

# **HOMEWORK...**

**NOTE:** Use US Imperial for pt, qt & gal

Worksheet - Converting Volumes Imp\_Metric.docx



Worksheet - Converting Capacity in Imp.docx





## Attachments

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Worksheet - Converting Capacity in Imp.docx

Worksheet - Converting Volumes Imp\_Metric.docx