Course: MFM2P Gr. 10 Applied **Lesson: 8 - 1**

Unit: Volume and Surface Area **Topic: Prerequisite Skills**

- ***homework check:*** **none**

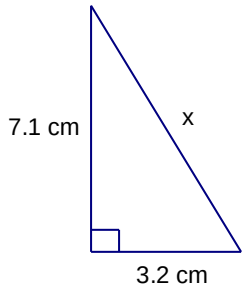
- ***note:*** **Prerequisite Skills**

Identifying two and three dimensional shapes is important when trying to determine either perimeter, surface area or volume in order to use the correct formula. Word definitions are important for shape recognition. For example,

polygon – two-dimensional figure constructed of any number of line segments
regular polygon – two-dimensional figure with every side equal in measure
circle – two-dimensional figure with each point equidistant from the centre
triangle – two-dimensional constructed from exactly three line segments
rectangle – two-dimensional figure with four sides meeting at right angles
square – two-dimensional figure with exactly four equal sides meeting at right angles
trapezoid – two-dimensional figure with four sides, one pair of which are parallel
prism – three-dimensional figure with the same polygon base and top
rectangular prism - three-dimensional figure with a rectangular base and top
cylinder - three-dimensional figure with the same circular base and top
pyramid – three-dimensional figure with a polygon base and triangular sides that meet at a point

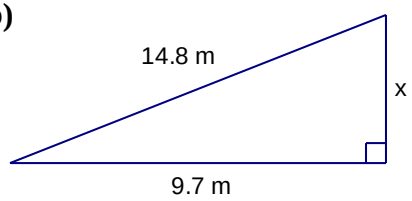
Sometimes the use of the Pythagorean Theorem is important for finding surface area. When given a right angle triangle, it is possible to find the third side given any other two. For example, find the unknown for each of the following.

a)



$$c^2 = a^2 + b^2$$
$$c^2 = 3.2^2 + 7.1^2$$
$$c^2 = 10.24 + 50.41$$
$$c^2 = 60.65$$
$$c = \sqrt{60.65}$$
$$c = 7.8cm$$

b)



$c^2 = a^2 + b^2$

$14.8^2 = 9.7^2 + b^2$

$219.04 = 94.09 + b^2$

$219.04 - 94.09 = b^2$

$124.95 = b^2$

$\sqrt{124.95} = b$

$b = 11.2m$

We may even have to recall some conversions from unit one in order to answer questions of surface area and volume as well as some formulas for the area of specific shapes. Remember that finding the area of a composite shape is done by breaking the shape into 2 or more common shapes and adding the area to find the total.

To find the perimeter of any shape, simply add the lengths of the sides together. The perimeter of a circle is called circumference. Some common formulas include:

circumference **of a circle =** πd **or** $2\pi r$

area **of a circle =** πr^2

area **of a triangle =** $\frac{bh}{2}$

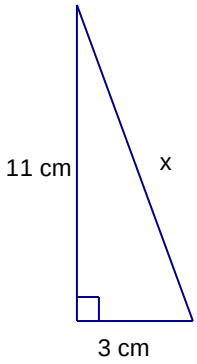
area **of a rectangle =** lw

homework assignment: **<u>Lesson 8 - 1</u>**

Lesson 8 – 1: Prerequisite Skills

1. Find the indicated SIDE LENGTH.

a)



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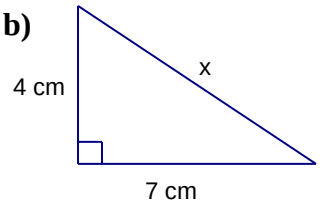

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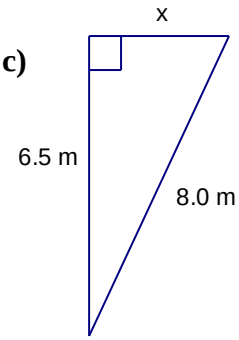
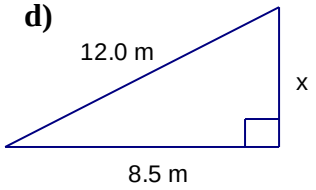
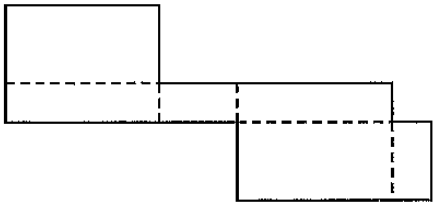


d)



2. For each net, identify the solid.

a)



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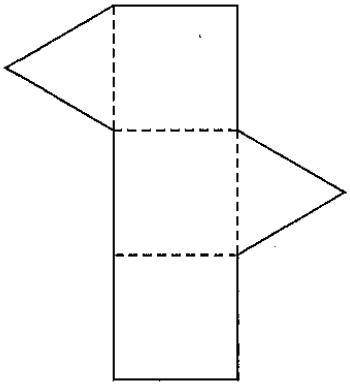

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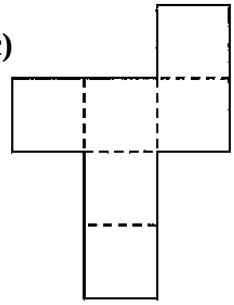

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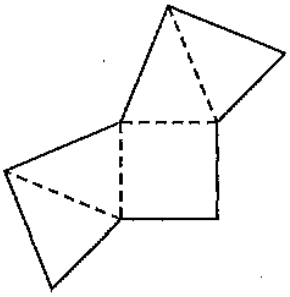

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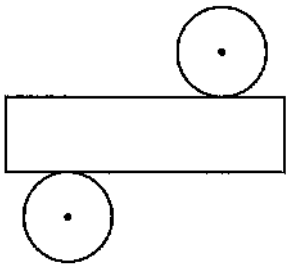
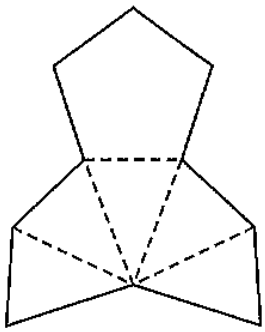


f)



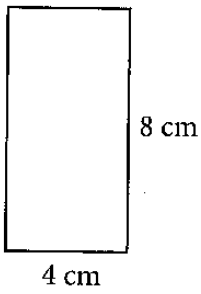
3. Convert each measure to the unit indicated.

a) 3.5 yards to feet **b) 241 cm to metres** **c) 7.5 L to millitres** **d) 5.5 gal. to pints**

e) 21 yd^2 to square feet **f) 1175 cm^3 to m^3** **g) 5 yds to m** **h) 25 km^2 to $miles^2$**

4. Find the area of the figures shown. Be sure to include the correct units.

a)



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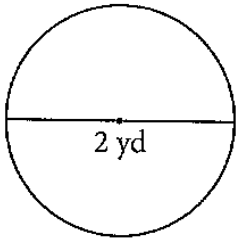

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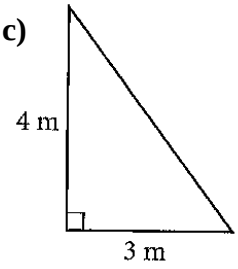
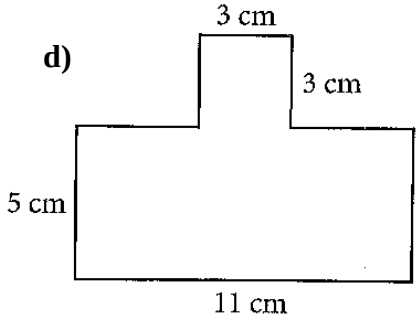
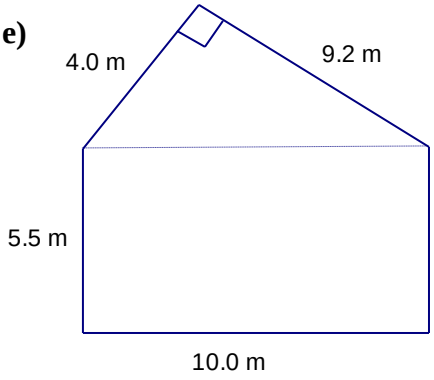


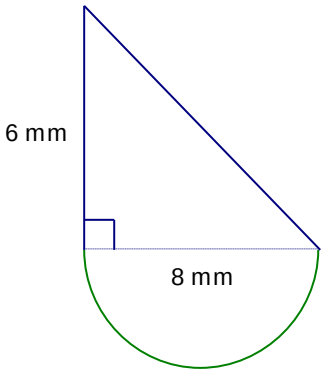
d)



e)



f)



Metric Imperial Conversion Charts/Tables

Metric length		
10 millimeters	=	1 centimeter
10 centimeters	=	1 decimeter
10 hectometers	=	1 kilometer (1000 meters)

Imperial/USA Length		
12 inches	=	1 foot
3 feet	=	1 yard

Metric area		
100 square mm	=	1 square centimeter
10000 square cm	=	1 square meter
100 square m	=	1 are
10 acres	=	1 hectare
100 hectares	=	1 square kilometer
1 square kilometer	=	1000000 square meters

Imperial/USA area		
144 square inches	=	1 square foot
9 square feet	=	1 square yard
4840 square yards	=	1 acre
640 acres	=	1 square mile

Metric mass		
1000 grams	=	1 kilogram

Imperial/USA weight		
16 ounces	=	1 pound

Metric capacity		
10 centiliters	=	1 decilitre
10 deciliters	=	1 litre

Imperial liquid capacity		
3 teaspoons	=	1 tablespoon
2 tablespoons	=	1 fluid ounce
2 cups	=	1 pint
1 pint	=	20 fluid ounces
2 pints	=	1 quart
4 quarts	=	1 gallon

Temperature

To convert from Celsius to Fahrenheit, first multiply by 9/5, then add 32.
To convert from Fahrenheit to Celsius, first subtract 32, then multiply by 5/9

Length

Metric			Imperial
1 millimetre [mm]		→	0.03937 in
1 centimetre [cm]	10 mm	→	0.3937 in
1 metre [m]	100 cm	→	1.0936 yd
1 kilometre [km]	1000 m	→	0.6214 mile

Imperial			Metric
1 inch [in]		→	2.54 cm
1 foot [ft]	12 in	→	0.3048 m
1 yard [yd]	3 ft	→	0.9144 m
1 mile	1760 yd	→	1.6093 km

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Area

Metric			Imperial
1 sq cm [cm^2]	100 mm^2	→	0.1550 in^2
1 sq m [m^2]	10,000 cm^2	→	1.1960 yd^2
1 hectare [ha]	10,000 m^2	→	2.4711 acres
1 sq km [km^2]	100 ha	→	0.3861 $mile^2$

Imperial			Metric
1 sq inch [in^2]		→	6.4516 cm^2
1 sq foot [ft^2]	144 in^2	→	0.0929 m^2
1 sq yd [yd^2]	9 ft^2	→	0.8361 m^2
1 acre	4840 yd^2	→	4046.9 m^2
1 sq mile [$mile^2$]	640 acres	→	2.59 km^2

Volume/Capacity

Metric			Imperial
1 cu cm [cm^3]		→	0.0610 in^3
1 cu decimetre [dm^3]	1,000 cm^3	→	0.0353 ft^3
1 cu metre [m^3]	1,000 dm^3	→	1.3080 yd^3
1 litre [L]	1 dm^3	→	1.76 pt
1 hectolitre [hl]	100 L	→	21.997 gal

Imperial			Metric
1 cu inch [in^3]		→	16.387 cm^3
1 cu foot [ft^3]	1,728 in^3	→	0.0283 m^3
1 fluid ounce [fl oz]		→	28.413 mL
1 pint [pt]	20 fl oz	→	0.5683 L
1 gallon [gal]	8 pt	→	4.5461 L

Mass

Metric			Imperial
1 milligram [mg]		→	0.0154 grain
1 gram [g]	1,000 mg	→	0.0353 oz
1 kilogram [kg]	1,000 g	→	2.2046 lb

Imperial			Metric
1 ounce [oz]	437.5 grain	→	28.35 g
1 pound [lb]	16 oz	→	0.4536 kg