

✚ *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

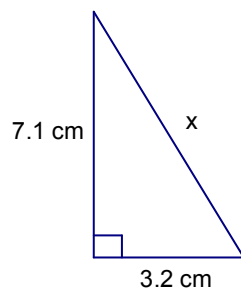
rectangular prism - three-dimensional figure with a rectangular base and top

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)



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

$$c^2 = 3.2^2 + 7.1^2$$

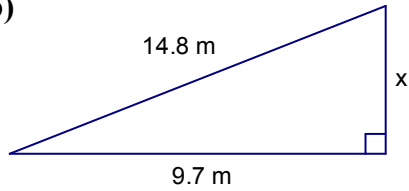
$$c^2 = 10.24 + 50.41$$

$$c^2 = 60.65$$

$$c = \sqrt{60.65}$$

$$c = 7.8\text{cm}$$

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:

$$\text{circumference of a circle} = \pi d \text{ or } 2\pi r$$

$$\text{area of a circle} = \pi r^2$$

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

$$\text{area of a rectangle} = lw$$

✚ **homework assignment: FM10 p. 362 # 1 – 4**

Metric Imperial Conversion Charts/Tables

Metric length		Imperial/USA Length	
10 millimeters	= 1 centimeter	12 inches	= 1 foot
10 centimeters	= 1 decimeter	3 feet	= 1 yard
10 decimeters	= 1 meter	22 yards	= 1 chain
10 meters	= 1 decameter	10 chains	= 1 furlong
10 decameters	= 1 hectometer	8 furlongs	= 1 mile (5280 feet)
10 hectometers	= 1 kilometer (1000 meters)		

Metric area		Imperial/USA area	
100 square mm	= 1 square centimeter	144 square inches	= 1 square foot
10000 square cm	= 1 square meter	9 square feet	= 1 square yard
100 square m	= 1 are	4840 square yards	= 1 acre
10 ares	= 1 hectare	640 acres	= 1 square mile
100 hectares	= 1 square kilometer		
1 square kilometer	= 1000000 square meters		

Metric mass		Imperial/USA weight	
1000 grams	= 1 kilogram	16 ounces	= 1 pound
1000 kilograms	= 1 ton	14 pounds	= 1 stone (UK)
UK shows United Kingdom Measure		8 stones (UK)	= 1 hundredweight (UK)
		1 hundredweight (UK)	= 112 pounds (UK)
		100 pounds	= 1 hundredweight (USA)

Metric capacity		Imperial liquid capacity	
10 milliliters	= 1 centilitre	2 teaspoons	= 1 dessertspoon
10 centiliters	= 1 decilitre	3 teaspoons	= 1 tablespoon
10 deciliters	= 1 litre	2 tablespoons	= 1 fluid ounce
1000 liters	= 1 cubic meter	5 fluid ounces	= 1 gill
		2 gills	= 1 cup
		2 cups	= 1 pint
		1 pint	= 20 fluid ounces
		2 pints	= 1 quart
		4 quarts	= 1 gallon
		USA liquid capacity	
		3 teaspoons	= 1 tablespoon
		2 tablespoons	= 1 fluid ounce
		4 fluid ounces	= 1 gill
		2 gills	= 1 cup
		2 cups	= 1 pint
		1 pint	= 16 fluid ounces
		2 pints	= 1 quart
		4 quarts	= 1 gallon
		8 pints	= 1 gallon'

Metric Imperial Conversion Charts/Tables

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
1 int nautical mile	2025.4 yd	→	1.853 km

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

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

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

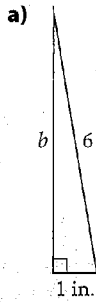
Metric			Imperial
1 milligram [mg]		→	0.0154 grain
1 gram [g]	1,000 mg	→	0.0353 oz
1 kilogram [kg]	1,000 g	→	2.2046 lb
1 tonne [t]	1,000 kg	→	0.9842 ton

Imperial			Metric
1 ounce [oz]	437.5 grain	→	28.35 g
1 pound [lb]	16 oz	→	0.4536 kg
1 stone	14 lb	→	6.3503 kg
1 hundredweight [cwt]	112 lb	→	50.802 kg
1 long ton (UK)	20 cwt	→	1.016 t

Get Ready!

Pythagorean Theorem

1. For each right triangle, find the length of the indicated side to the nearest tenth of a unit. The first part has been done for you.



The length of one leg is 1 in. and the length of the hypotenuse is 6 in.

$$1^2 + b^2 = 6^2$$

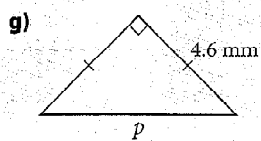
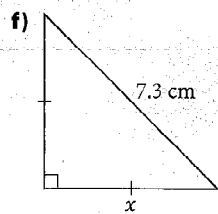
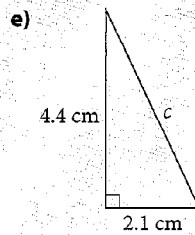
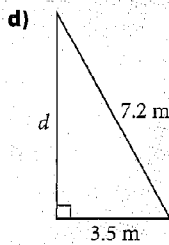
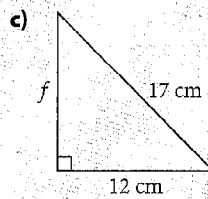
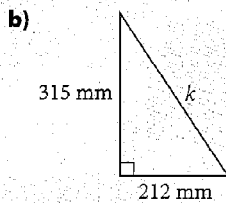
$$1 + b^2 = 36$$

$$b^2 = 36 - 1$$

$$b^2 = 35$$

$$b = \sqrt{35}$$

$$b \approx 5.9 \text{ in.}$$

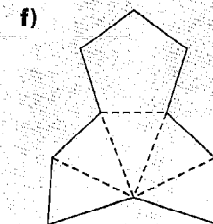
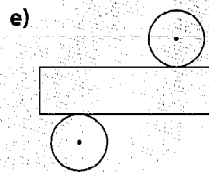
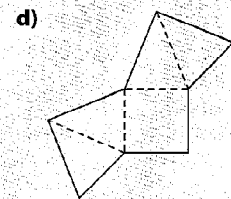
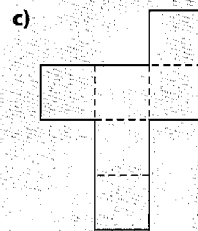
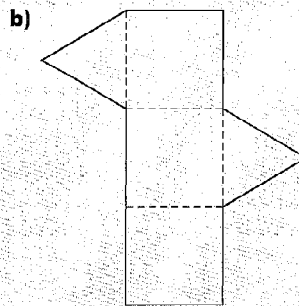


Nets

2. For each net, identify the solid. The first part has been done for you.



The net has three pairs of congruent rectangular faces. It is a net for a rectangular prism, or box.



Chapter Problem

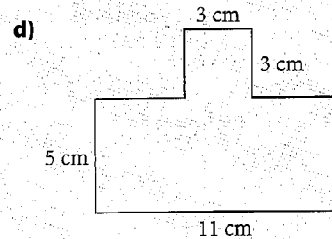
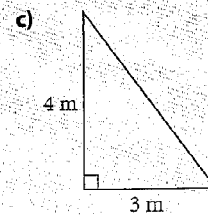
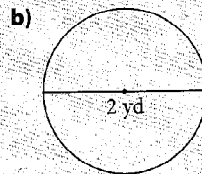
Consumers often decide whether to purchase an item based on the way it is packaged. Manufacturers devote a large number of resources to finding the best way to package their merchandise. Vanessa's new company manufactures and markets ski, skateboard, and snowboard accessories. She needs to design the packaging for her products. Vanessa plans to sell her products in both Canada and the United States. What does Vanessa need to consider as she designs packaging for her products?



Convert Measurements

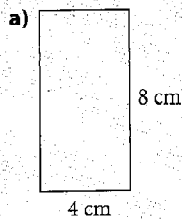
3. Convert each measure to the unit indicated. The first part has been done for you.

- a) 3.5 yd feet
There are 3 ft in 1 yd.
So, 3.5 yd = 3.5 × 3, or 10.5 ft.
- b) 241 cm metres
- c) 7.5 L millilitres
- d) 5.5 gallons pints
- e) 21 yd³ cubic feet
- f) 1175.4 cm² square metres



Area

4. Find the area of each figure.



$$\begin{aligned} A &= l \times w \\ &= 4 \times 8 \\ &= 32 \end{aligned}$$

The area of the rectangle is 32 cm².