## Activate Prior Knowledge

Metric and Imperial Units of Length

See the table on page 60 for the conversion factors.

Example 1: Convert each length.

a) 50 feet to metres

$1\text{ ft} \doteq 0.3048\text{ m}$

$\therefore 50\text{ ft} = 50 \times 0.3048\text{ m}$

$\doteq 15.24\text{ m}$

b) 20 metres to inches

$1\text{ m} \doteq 39.37\text{ inches}$

$20\text{ m} = 20 \times 39.37\text{ inches}$

$\doteq 799.4\text{ inches}$

c) 95 km to miles

$1\text{ mile} \doteq 1.609\text{ km}$

$1\text{ km} \doteq 0.6214\text{ mi}$

$\therefore 95\text{ km} = 95 \times 0.6214\text{ mi}$

$\doteq 59\text{ mi}$

d) 16 $\frac{1}{2}$ inches to centimetres

$1\text{ in} \doteq 2.54\text{ cm}$

$\therefore 16.5\text{ in} = 16.5 \times 2.54\text{ cm}$

$\doteq 41.91\text{ cm}$

e) 6.4 m to feet and inches

$1\text{ m} \doteq 3.2808\text{ ft}$

$6.4\text{ m} = 6.4 \times 3.2808\text{ ft}$

$\doteq 20.99712\text{ ft}$

$0.99712\text{ ft} \doteq 0.99712 \times 12\text{ in}$

$\doteq 11.9654\text{ in}$

$\therefore 6.4\text{ m} = 20\text{ ft } 11.97\text{ in}$

$1\text{ ft} = 12\text{ in}$

f) 37 cm to inches

$1\text{ in} \doteq 2.54\text{ cm}$

$1\text{ cm} \doteq 0.3937\text{ in}$

$\therefore 37\text{ cm} \doteq 37 \times 0.3937\text{ in}$

$\doteq 14.6\text{ in}$

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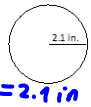
## Perimeter & Area

Perimeter – the distance around the outside of an object.

Area – the number of square units needed to cover an object.

Example 1: Determine the perimeter and area of the following shapes.

a)




$r = 2.1\text{ in}$

$\therefore P = 2\pi r$

$= 2 \times 3.14 \times 2.1$

$\doteq 13.2\text{ in}$

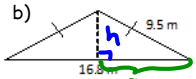
$\therefore A = \pi r^2$

$= 3.14 \times (2.1)^2$

$= 3.14 \times (4.41)$

$\doteq 13.8\text{ in}^2$

b)




$8.4\text{ m}$

$h^2 + 8.4^2 = 9.5^2$

$h^2 = 9.5^2 - 8.4^2$

$h^2 = 19.69$

$h = \sqrt{19.69}$

$h \doteq 4.4\text{ m}$

$P = 9.5 + 9.5 + 16.8$

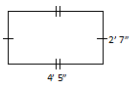
$= 35.8\text{ m}$

$A = \frac{b \times h}{2}$

$= \frac{16.8 \times 4.4}{2}$

$= 39.96\text{ m}^2$

c)




$2'\,7" = 2 \times 12 + 7$

$= 24 + 7$

$= 31\text{ in}$

$4\text{ ft } 5\text{ in} = 4 \times 12 + 5$

$= 48 + 5$

$= 53\text{ in}$

$\therefore P = 2(4'5" + 2'7")$

$= 2(7')$

$\doteq 14\text{ ft}$

$\therefore A = l \times w$

$= 53 \times 31$

$= 1643\text{ in}^2$

$\doteq 1643 \times 0.00694\text{ ft}^2$

$\doteq 11.4\text{ ft}^2$

$1\text{ in} = 0.0833\text{ ft}$

$1\text{ in}^2 = 0.0833^2\text{ ft}^2$

$\doteq 0.006938897\text{ ft}^2$

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Volume & Surface Area

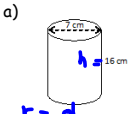
Volume – the amount of space occupied by an object measured in cubic units.

Surface Area – the total area of the surface of an object.

Capacity – a measure of how much liquid a container can hold.

Example 1: Determine the Volume & Surface Area of the following.

a)

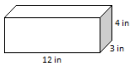



$r = \frac{d}{2}$
$= \frac{7}{2}$
$= 3.5$ cm

$\therefore V = \pi r^2 \times h$
$= 3.14 \times (3.5)^2 \times 16$
$\doteq 615.44 \text{ cm}^3$

$\therefore SA = 2\pi r^2 + 2\pi rh$
$= 2\pi r(r + h)$
$= 2(3.14)(3.5)(3.5+16)$
$\doteq 21.98(19.5)$
$\doteq 428.61 \text{ cm}^2$

b)




$\ell = 3$ in
$w = 4$ in
$h = 12$ in

$\therefore V = \ell \times w \times h$
$= 3 \times 4 \times 12$
$= 144 \text{ in}^3$

$\therefore SA = 2\ell w + 2\ell h + 2wh$
$= 2(\ell w + \ell h + wh)$
$= 2(3\times4 + 3\times12 + 4\times12)$
$= 2(12 + 36 + 48)$
$= 2(96)$
$= 792 \text{ in}^2$

If $1 \text{ cm}^3 = 1$ mL, how much liquid would the above containers hold?

$1 \text{ in} \doteq 2.54$ cm
$1 \text{ in}^2 = (2.54)^3 \text{ cm}^3$
$= 16.387 \text{ cm}^3$
$\therefore 144 \text{ in}^3 = 144 \times 16.387 \text{ cm}^3$
$\doteq 2359.73 \text{ cm}^3$
$= 2359.73$ mL

Convert to fluid ounces.

$1$ mL $\doteq 0.0352$ fluid ounce
$\therefore 2359.73$ mL $= 2359.73 \times 0.0352$ fluid ounce
$\doteq 83.1$ fluid ounce

Assigned Work: Pg. 60-65: #1, 2

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