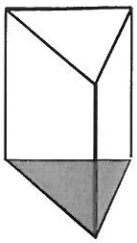
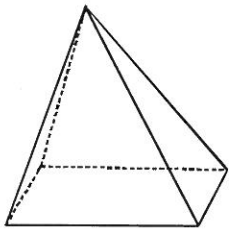
Worksheet 2015-8EQ-00004(1)

(1) Classify each of the following polyhedrons. Use the words in the word bank.

Cube	Triangular prisms	Sphere
Cone	Rectangular pyramid	Tetrahedron
Rectangular prisms		

(a) 

(b) 

(c) 

Triangular prism Rectangular pyramid Cone

(2) Convert the following to the given units in brackets:

(a) 32 cm^2 (m^2)

$= 32 \div (100)^2\ m^2$

$= 0,0032\ m^2$

(b) 1 000 km^2 (m^2)

$= 1000 \times (1000)^2\ m^2$

$= 1\,000\,000\,000\ m^2$

(c) 1,345 mm^3 (cm^3)

$= 1,345 \div (10)^3\ cm^3$

$= 0,001345\ cm^3$

(d) 4 liter (cm^3)

$= 4 \times 1000\ cm^3$

$= 4\,000\ cm^3$

(e) 26 ha (m^2)

$= 26 \times 10\,000\ m^2$

$= 260\,000\ m^2$

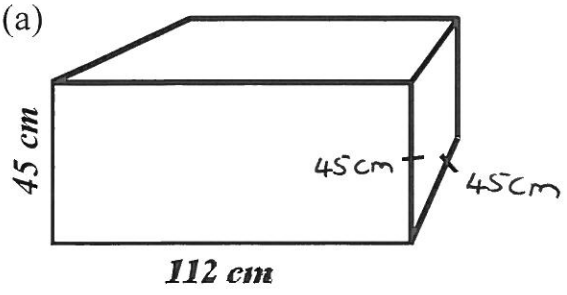
(f) 3 m^3 (mm^3)

$= 3m^3 \times (1000)^3\ mm^3$

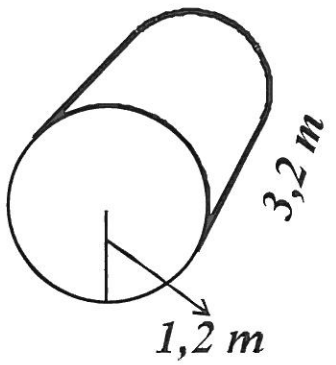
$= 3\,000\,000\,000\ mm^3$

(3) Calculate the surface area of the following, correct to 2 dec:

(a)



(b)



Surface area

$= 2[L \times B + B \times H + H \times L]$

$= 2[112 \times 45 + 45 \times 45 + 45 \times 112]$

$= 2[5040 + 2025 + 5040]$

$= 2[12\,105]$

$= 24\,210\ cm^2$

Surface area

$= 2\pi r(r + H)$

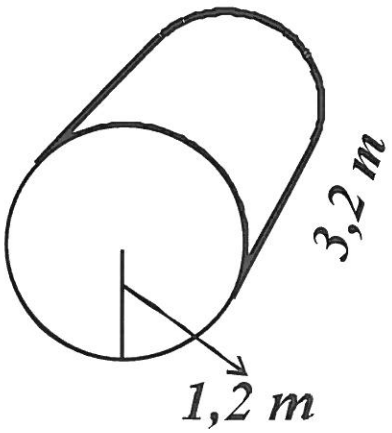
$= 2\pi \times 1{,}2m\,(1{,}2m + 3{,}2m)$

$= 33{,}1752\ldots\ m^2$

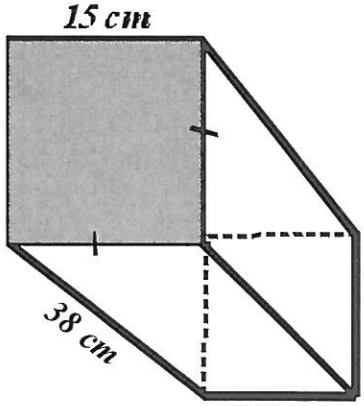
$\approx 33{,}18\ m^2$

(4) Calculate the volume, correct to the nearest integer, of each of the following. Give the volume in cm^3.

(a)



(b)



Volume

$= \pi r^2 H$

$= \pi (1{,}2)^2 (3{,}2)$

$= 14{,}47\ldots\ m^3$

$= 14{,}47\ldots \times (100)^3\ cm^3$

$\approx 14\,476\,459\ cm^3$

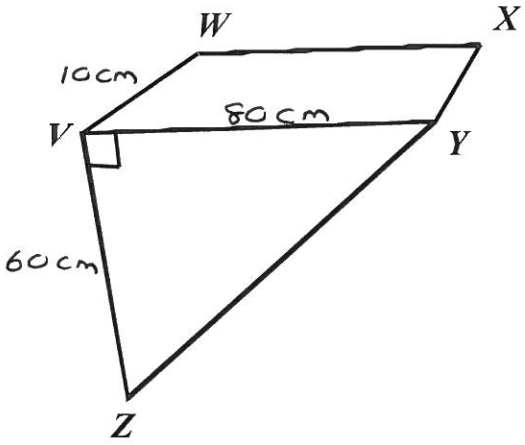
Volume

$= L \times B \times H$

$= (15cm) \times (15cm) \times (38cm)$

$= 8550\ cm^3$

(5) A triangular prism, as in the sketch, is cut from wood.
VW = 10 cm, VY = 80 cm and VZ = 60 cm.



(a) Calculate the length of YZ.
(b) Calculate the volume of wood the prism takes up in cm^3.
(c) Calculate the volume of wood the prism takes up in m^3.
(d) Calculate the total surface area of the prism in mm^2.
(e) If the prism is evenly divided into five smaller triangular prisms, answer the following questions:
(i) Each one of the smaller triangular prisms will be congruent to:
Δ VWY or Δ VZY or Δ WXY
(ii) Determine the volume of each of the smaller triangular prisms.
(iii) Will the ratio between the volume of the original prism and the volume of one of the five smaller triangular prisms be equal to the ratio between the height of the original prism and the height of one of the smaller triangular prisms?

(a) $YZ^2 = VY^2 + VZ^2$ [Pythagoras]
$YZ^2 = (80)^2 + (60)^2$
$= 6\,400 + 3\,600$
$YZ^2 = 10\,000$
$\therefore YZ = 100$ cm

(b) Volume = area base × H
$= (\frac{1}{2} b \times \perp h) \times H$
$= (\frac{1}{2} \times 80 \times 60) \times 10$
$= 24\,000\ cm^3$

(c) $24\,000\ cm^3$
$= 24\,000 \div (100)^3\ m^3$
$= 0{,}024\ m^3$

(d) Surface area

$= 2 \times \Delta^{e} + \square + \square + \square$

$= 2 \times (\frac{1}{2} b \times h) + (L \times B) + (L \times B) + (L \times B)$

$= 2 \times (\frac{1}{2} \times 80 \times 60) + (10 \times 80) + (10 \times 60) + (10 \times 100)$

$= 4800 + 800 + 600 + 1000$

$= 7200 \text{ cm}^2$

$= 7200 \times (10)^2 \text{ mm}^2$

$= 720\,000 \text{ mm}^2$

(e) (i) ΔVZY

(ii) Volume $= 24\,000 \text{ cm}^3 \div 5$

$= 4\,800 \text{ cm}^3$

(iii) $\frac{\text{Volume org. prism}}{\text{Volume smaller prism}} = \frac{24\,000 \text{ cm}^3}{4\,800 \text{ cm}^3}$

$= \frac{5}{1}$

$= 5:1$

$\frac{\text{Height org. prism}}{\text{Height smaller prism}} = \frac{10 \text{ cm}}{2 \text{ cm}}$

$= \frac{5}{1}$

$= 5:1$

$\therefore$ The ratio is the same