

Eastern Goldfields College
Mathematics Essentials 2016
Investigation 4 – Packaging and Proportions

DUE DATE: _____

TOTAL MARKS: 47

This investigation is a take-home task worth 5% of your semester mark.

PART A [21 marks] - CAPACITY

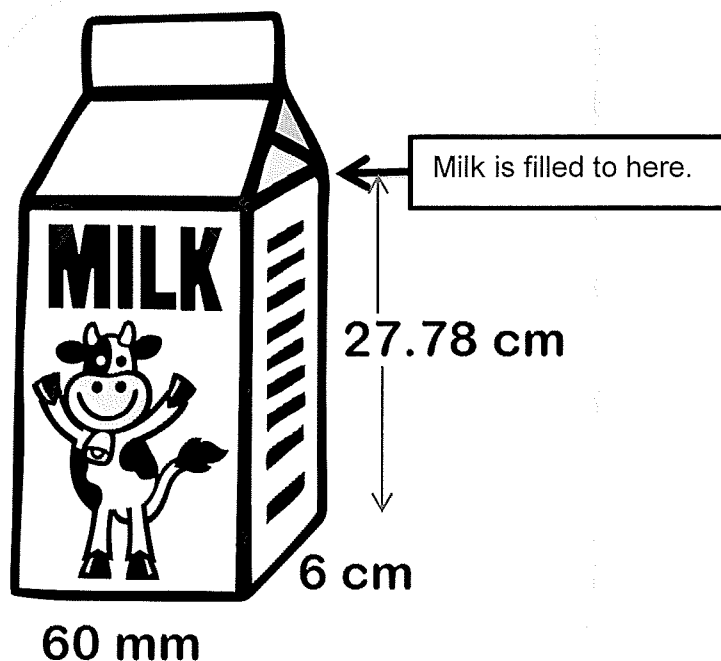
Question 1 (4 marks: 3, 1)

- a) Calculate the volume of the milk carton shown in the diagram on the right. Round your answer to the nearest whole. Show your working.

$$\begin{aligned} V &= 6 \times 6 \times 27.78 \\ &= 1000.08 \checkmark \\ &= 1000 \text{ cm}^3 \checkmark \end{aligned}$$

- b) What is the capacity of this milk carton?

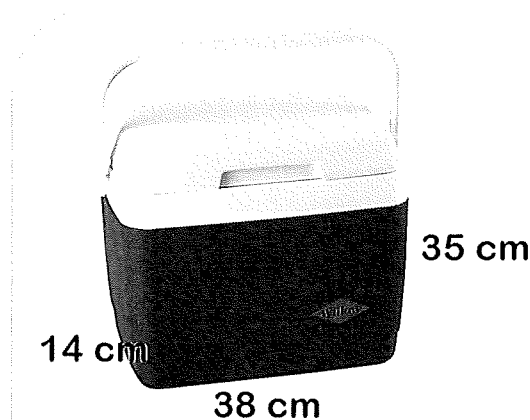
1 L or 1000 ml ✓



Question 2 (2 marks)

How many milk cartons can you fit into the Esky shown. Show your working.

$$\begin{aligned} 38 \div 6 &\sim 6 & 14 \div 6 &\sim 2 \text{ rows} \\ \text{across} & & & \checkmark \\ 6 \times 2 &= 12 \text{ cartons} \\ & \checkmark \end{aligned}$$



Question 3 (3 marks)

If the milk carton holds $5\frac{1}{2}$ serves. How many millilitres is in a serve? Round to the nearest ten.

$$1000 \div 5.5 = 181.8 \therefore 180 \text{ ml.} \checkmark$$

Question 4 (12 marks: 3, 2, 2, 5)

To make the drink called Olim, 5% of the ingredients is milo and 95% is milk.

- a) One glass is filled with Olim and has a capacity of 420 mL.
i. How many mL of the glass would be milo? (2 marks)

$$0.05 \times 420 = 21 \text{ mL}$$

- ii. If 1 mL = 1 gram, how many grams of milo is required? (1 mark)

$$21 \text{ g}$$

- b) If a teaspoon holds 5 grams, how many teaspoons of Milo is required to make 1 drink?
Round to the nearest teaspoon.

$$21 \div 5 = 4.2 \checkmark$$

$\therefore 4 \text{ tspns } \checkmark$

- c) What proportion of the drink, as a simplified fraction, is milk?

$$\frac{399}{420} = \frac{13}{20} \checkmark$$

- d) John is having a party of 27 guests. Each guest is having one glass of Olim.

- i. How much milk is required to cater for the guests? (1 mark)

$$399 \times 27 = 10773 \text{ mL } \checkmark \quad (420 - 21 = 399)$$

- ii. How much milo is required to cater for the guests? (1 mark)

$$21 \times 27 = 567 \text{ g } \checkmark$$

- iii. How many cartons of milk will John need to purchase to cater for his guests? (2 marks)

$$10773 \div 1000 = 10.773 \checkmark \therefore 11 \text{ cartons}$$


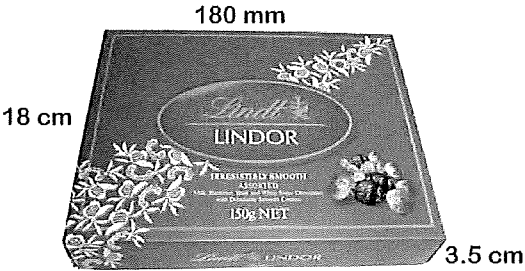

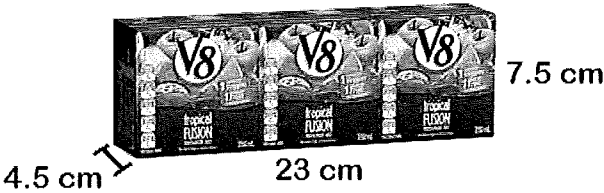

- iv. If each carton costs \$1.75, how much will it cost John? (1 mark)

$$11 \times 1.75 = \$19.25 \checkmark \quad \text{F/T.}$$

PART B [26 marks] - PACKAGING

Question 1 (10 marks: 2, 2, 2, 1, 2, 1)

Find the volume of each of the shapes below.

	$V = \frac{1}{2} \times 6 \times 5.5 \times 21 \checkmark$ $= 346.5 \text{ cm}^3 \checkmark$
	$V = 3.5 \times 18 \checkmark \times 18$ $= 1134 \text{ cm}^3 \checkmark$
	$V = 6 \times 6 \times 20 \checkmark$ $= 720 \text{ cm}^3 \checkmark$
	$V = 4.5 \times 7.5 \times 23 \checkmark$ $= 776.25 \text{ cm}^3 \checkmark$
	$V = 8 \times 9 \checkmark \times 19$ $= 1368 \text{ cm}^3 \checkmark$

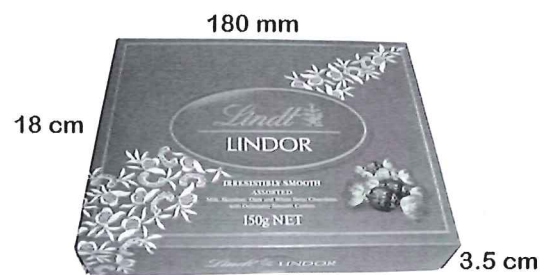
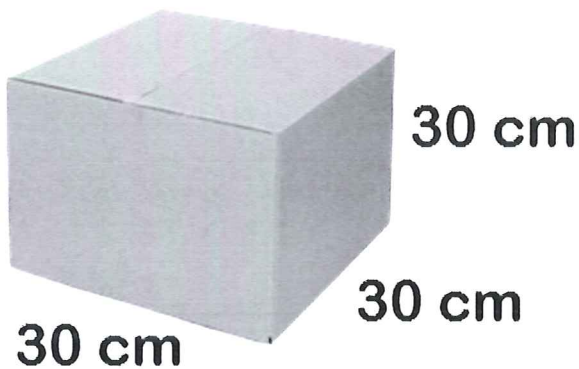


$$V = 5.5 \times 13 \times 16.5$$

$$= 1179.75 \text{ cm}^3 \checkmark$$

Question 2 (8 marks: 4, 4)

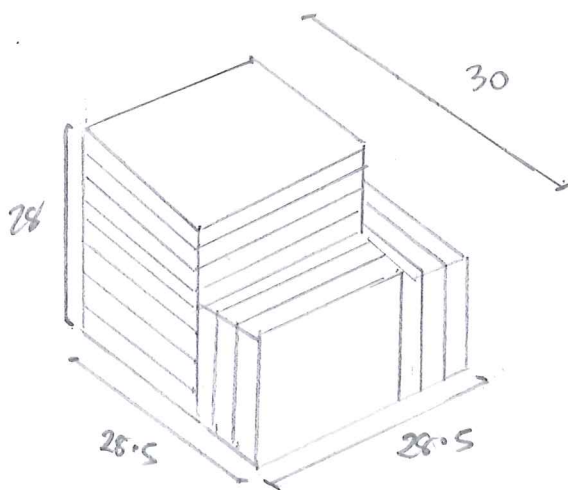
Below is shipping carton along with its dimensions. The volume of this shipping carton is $27\,000 \text{ cm}^3$.



a) Lindt boxes in a shipping carton.

i. Draw a diagram, of how the Lindt boxes would be packaged within the shipping carton. Ensure you clearly label or indicate or explain:

- The number of Lindt boxes in a row
- How the boxes would be positioned
- The number of layers



$\sqrt{2}$ show dimension of stacks.
 $\sqrt{2}$ show stacks
 $\sqrt{2}$ show behind stack.
 $\sqrt{2}$ link dimensions with box.

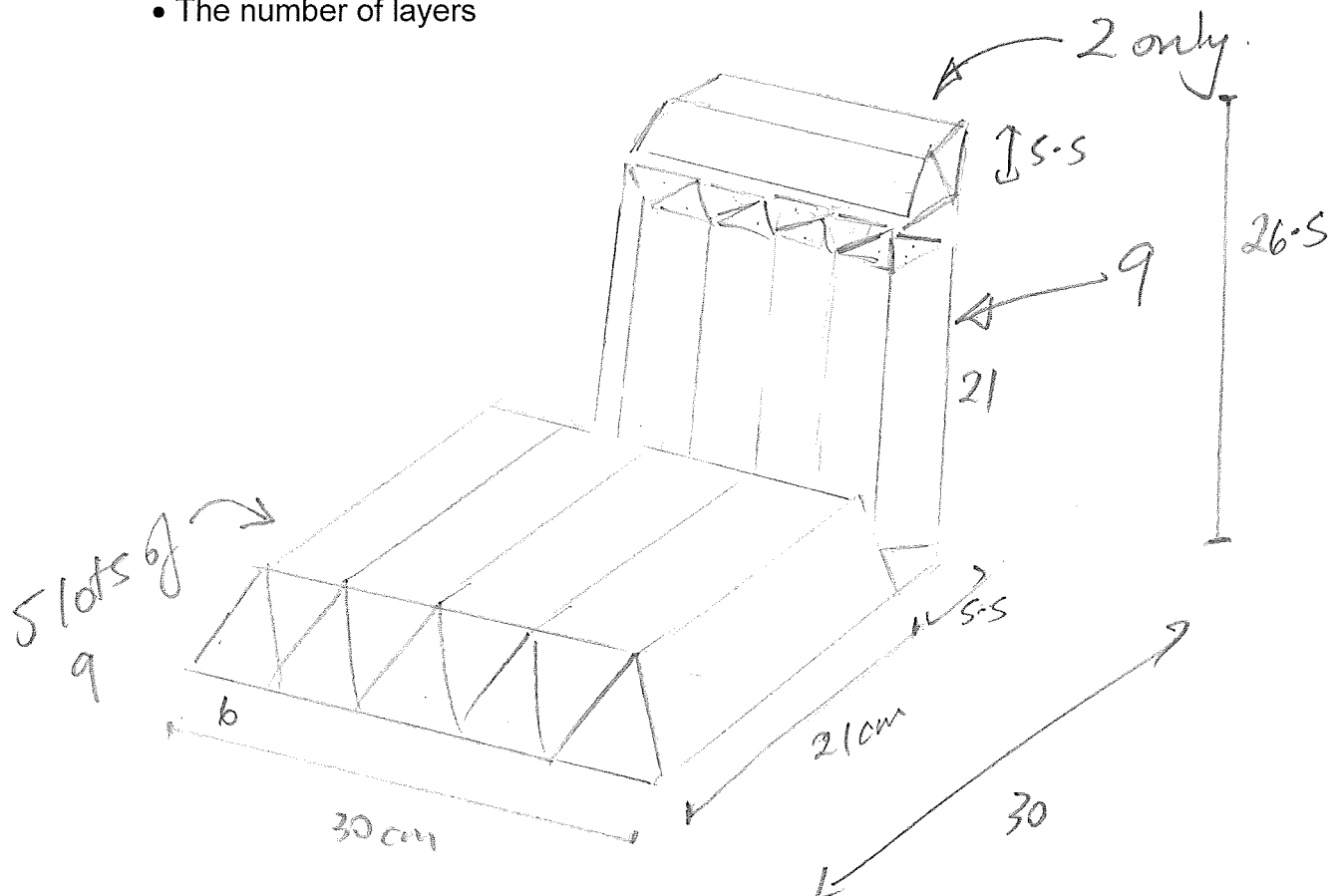
- ii. What is the maximum number of Lindt boxes that can fit into one shipping carton?
Ensure you show your working.

$$\begin{array}{rcl}
 30 \div 3.5 \sim 8 & \sqrt{2} & 3 \text{ behind} \\
 12 \div 3.5 \sim 3 & \sqrt{2} & \\
 8 + 3 + 3 = 14 \text{ boxes} & \sqrt{2} & \sqrt{2}
 \end{array}$$

- b) Toblerones in a shipping carton.

- i. Draw a diagram, of how the Toblerones would be packaged within the shipping carton. Ensure you clearly label or indicate or explain:

- The number of Toblerones in a row
- How the boxes would be positioned
- The number of layers



show dimensions $\sqrt{2}$
 show toblerones in a row $\sqrt{2}$ (sketch).
 Explain no. of layers $\sqrt{2}$
 link to dimensions of box $\sqrt{2}$

- ii. What is the maximum number of Toblerones that can fit into one shipping carton? Ensure you show your working.

$$5 \times 9 = 45 \quad \checkmark$$

$$45 + 9 + 2 = 56 \text{ boxes of toblerones.}$$

$$\checkmark$$

Question 3 (8 marks: 3, 3, 2)

Juice boxes are transported in open trays, as shown in the diagram below.



- a) A pack of juice boxes, as shown in the picture, contains 6 individual 200 mL boxes within the pack.

- i. What is the maximum number of juice boxes can be transported within a tray?

$$36 \quad \checkmark$$

3 layers of 2
(6 x 6)

6	6
6	6
6	6

- ii. What is the capacity of juice within the tray in litres?

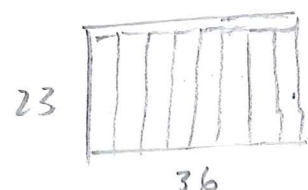
F.T. $(36) \times 200 = 7200 \text{ ml} \therefore 7.2 \text{ L} \quad \checkmark$

- b) Juice can also be packaged in packs 3 individual 250 mL boxes within the pack, as shown.

- i. What is the maximum number of juice boxes can be transported within a tray?

$$40 \div 4.5 \approx 8$$

$$8 \times 3 = 24$$



- ii. What is the capacity of juice within the tray in litres?

F.T. $(24) \times 250 = 6000 \text{ ml} \therefore 6 \text{ L} \quad \checkmark$

c) 1 millilitre = 1 gram. What is total weight, in kilograms, for a tray of juice boxes in a:

i. 6 pack

7.2 kg ✓

ii. 3 pack

6 kg ✓

