Exam Practice!

3.2 More water must be taken to the refreshment stations. The water will be transported in cylindrical buckets (with lids) with a maximum capacity of 20 litres of water.

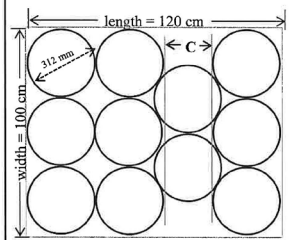
The cylindrical buckets, containing water, with lids are shown below.

Picture of a bucket (20 ℓ capacity) with lid

Outside diameter of bucket = 31,2 cm

NOTE: Bucket walls are 2 mm thick.

Top view of buckets placed on a solid rectangular pallet



[Source: www.mevaplast.co.uk]

Use the information and picture above to answer the questions that follow.

3.2.1 Determine the maximum height (in cm) of the water in the bucket if the outside diameter of the bucket is 31,2 cm.

You may use the formula:

Volume of a cylinder = $\pi \times (\text{radius})^2 \times \text{height}$

where $\pi = 3{,}142$ and $1\ \ell = 1\ 000\ cm^3$ (7)

3.2.2 Buckets are placed on the pallet, as shown in the diagram above.

(a) Calculate the unused area (in cm^2) of the rectangular floor of the solid pallet.

You may use the formula:

Area of a circle = $\pi \times (\text{radius})^2$, where $\pi = 3{,}142$ (6)

(b) Determine length **C**, as shown in the diagram above. (3)

Answers

3.2.1	$20\ \ell = 20 \times 1\ 000\ cm^3$ ✓C Inner diameter /*Binneste middellyn* $= 31{,}2\ cm - 2 \times 0{,}2\ cm$ $= 30{,}8\ cm$ ✓A ✓MCA $V = 3{,}142 \times (30{,}8cm \div 2)^2 \times$ height/*hoogte* ✓SF $20\ 000\ cm^3 = 3{,}142 \times (\frac{30{,}8}{2}cm)^2 \times \mathbf{H}$ $H = \frac{20\ 000\ cm^3}{3{,}142 \times 237{,}16cm^2}$ ✓M $= \frac{20\ 000}{745{,}15672}cm$ ✓S $= 26{,}84\ cm$ ✓CA	1C conversion 1A calculating inner diameter 1MCA radius 1SF correct values 1M changing the subject 1S simplification 1CA height (7)	M L3
3.2.2 (a)	Area of base of 1 bucket/*Oppervlakte van 1 emmer basis* ✓A $= 3{,}142 \times (15{,}6\ cm)^2$ $= 764{,}63712\ cm^2$ ✓CA Area of base of 11 buckets/*Oppervlakte van 11 emmers* $= 11 \times 764{,}63712\ cm^2 = 8\ 411{,}00832\ cm^2$ ✓CA Area of base of pallet/*Oppervlakte van palletbasis* ✓SF $= 100\ cm \times 120\ cm = 12\ 000\ cm^2$ ✓A Difference/*Verskil* $= 12\ 000\ cm^2 - 8\ 411{,}00832\ cm^2$ $= 3\ 588{,}99168\ cm^2$ ✓CA	1A radius 1CA simplification 1CA multiply by 11 1SF correct values 1A rectangular area 1CA area unused **NPR** (6)	
3.2.2 (b)	✓A $120\ cm = 31{,}2 \times 3 + C$ $C = 120\ cm - 31{,}2\ cm \times 3$ ✓M $= 26{,}4cm$ ✓CA	1A 120 cm 1M multiplying and subtracting 1CA finding C (3)	

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