Enged 1100 10/19/23	Sec 13 group 204	Meredith Bartel Meredith Bartel	1/2

Problem Statment.

Find how many truck are needed to meet the demand. In order to solve this question you need to solve for an estimation on how many cans of 12oz. sodas fit on a truck with the dimentions of 52.58'x833'x9.25' and palets will be going on the truck also with dimentions of 48"x48"x5.5" and it can hold 3000 pound s while the trailer can hold 45000 pounds.

Diagram:

Theory:

Volume of cylinder = $\pi \cdot r^2 \cdot h$

Assumptions:

- each soda will weigh .75 I bs
- Sodas will be packed without any wasted space

calculation:

dimention of truck = $52.58' \times 8.33' \times 9.25' = 4006.73\ ft^3$

dimentions of pallet = $48" \times 48" \times 5.5" = 7.33 ft^3$

If 1 can = .75 Ibs
1 pallet holds 3000 I bs
1 truck holds 45000 I bs

$\frac{3000\ I\ bs}{.75\ I\ bs} = 4000$ cans per pallet by weight

$\frac{45000\ I\ bs}{3000\ I\ bs} = 15$ palets fit by weight

15 palets x 4000 cans per = 60000 cans per truck by weight

Volume of soda = $(2.612ft)^2 \cdot \pi \cdot 4.83ft = .0145\ ft^3$ per can

$4006.73 ft^3 - (7.33 ft^3 \times 15_{\text{max palets}}) = 3096.78 ft^3$ = room left after palets

(7.33 ft³ = demention of palet)

$\frac{3896.78 ft^3}{.0145 ft^3} = 268,808.96$ cans can fit in truck only by dimentions

So, 60,000 cans of soda can fit in each truck and weight is the limiting factor in this problem

Verification

Volume of can is

$(2.612/12)^2 \cdot \pi \cdot 4.83 = .0145 ft^3$ is volume per can

$52.58' \times 8.33' \times 9.25' = 4006.73$

$\frac{.0145 ft^3}{4006.73} = 268,808.96 ft^3$

This answer is higher than what I came up with and since the maximum amount of cans by weight that can fit is 60,000 what I got seems resonable.

conclusion:

Through several calculations I found that the maximum amount of cans of soda that can fit on this truck is estimated to be 60,000 cans. I also found that the amount of soda that could be put on the truck was limited by weight.

A.) My estimation should be pretty close to the acual amount of soda that can fit on a truck because the only number that I used that could give us the wrong results would be how much the can weighs but I know how much a can of soda weighs because I weighed one myself.

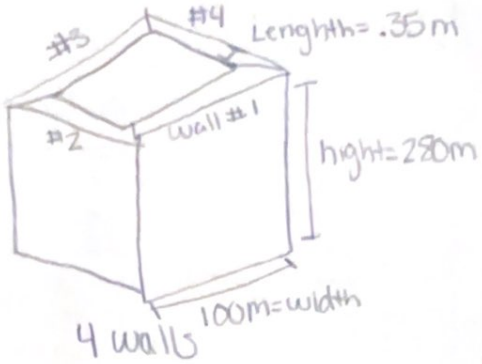
B.) It would be better if I estimated too low because if I estimated too high then soda would get wasted and it would be bad for the envet if there is soda getting wasted.

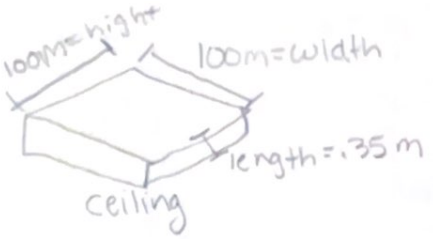
Ened 1100 10/19/23	Sec 13 group 204	Meredith Bartel Meredith Bartel	1/2

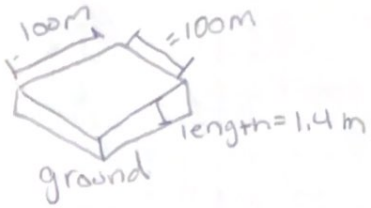
problem statment

You are employed by a moving company and are tasked with moving Van Wormer hall which is circmaris oldest building 25 ft. To relocate it you will need to find how many pounds the building weighs based on the dimentions of the building.

Diagram:







Theory:

Volume of cube = l x w x h
Density of concrete = 492 lbs per cubic meter
Weight = volume x desity

Assumptions

- There are 4 walls 1 ceiling a 1 ground
- all 4 wall weigh the same
- The building is hollow inside with nothing in it
- The building is made of only concrete

calculations

.35m x 280m x 100m = 9800 m^3 for 1 wall
9800 m^3 x 4_{walls} = 39,200 for 4 walls
100m x 100m x .35m = 3500 m^3 for ceiling
100m x 100m x 1.4m = 14000 m^3 for ground
39200 m^3 + 3500 m^3 + 14000 m^3 = 56,700 m^3 in total
56,700 m^3 x 492 lbs = 27,896,400 lbs
the building is estimated to weigh 27,896,400 pounds

Verification.

Low: density volume

470 Ibs per m^3 x 54,700 m^3 = 25,709,000 Ibs

high: density volume

500 Ibs per m^3 x 59,000 m^3 = 29,500,000 Ibs

This is a rough esimate on the volume of the building based on just guesing so the volume was not found through using a formula so it is more simple then how I found the actual estimated weight.

Conclusion:

By calculating the volume of 4 walls a ceiling and the ground in cubic meters I could then find the weight of the concrete building. I did this by multiplying Density x volume and we knew the density is 492 Ibs per cubic meter. After all calculations I found the building is estimated to weigh 27,896,400 pounds.