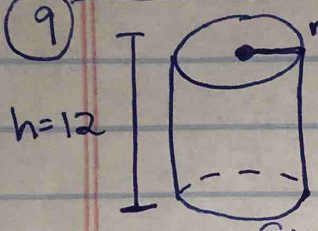
HM3 Surface Area Day 2: 9-15, 27-32

(9)



Formulas

$SA = LA + 2 \cdot \text{Area of Base}$

$SA = 2\pi rh + 2\pi r^2$

$SA = 2\pi(2)(12) + 2\pi(2)^2$

$SA = 48\pi + 8\pi$

$SA = 56\pi \text{ units}^2$

Shape by Shape

2 circles, 1 rectangle

- circles: $2(\pi r^2)$

  $2(\pi(2)^2)$

  8π

- rectangle: $l \cdot w$

  $(2\pi r)w$

  $2\pi \cdot 2 \cdot 12$

  48π

(10) $LA = 40\pi \text{ cm}^2$ height = 5 cm

*we know that Lateral Area = Perimeter of Base · Height

$LA = \text{circumference} \cdot \text{height}$

$40\pi = 2\pi r \cdot 5$

$40\pi = 10\pi r$

$4 = r$

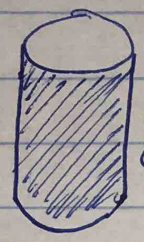
*now we can find the total Surface Area! we just need to add the area of the circular bases!

$SA = 40\pi + 2\pi(4)^2$

$SA = 40\pi + 32\pi$

$SA = 72\pi \text{ cm}^2$

(11)



circumference = 9π cm

*think about the label on a can of beans.... it doesn't go on the top or bottom! All we need is the lateral area!

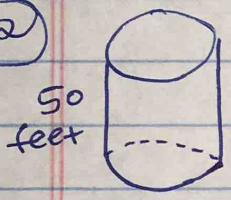
LA = Perimeter of Base · Height

LA = circumference · Height

LA = $9\pi \cdot 15$

LA = 135π cm^2

(12)



circumference = 118 feet

SA = LA + ~~2 ·~~ Area of Base

↑ we don't need to paint the bottom!

*we can use the circumference to find the radius: $118 = 2\pi r$

$18.78 = r$

Formulas:

SA = LA + Area of Base

SA = Perimeter of Base · Height + πr^2

SA = circumference · Height + πr^2

SA = $2\pi r \cdot h + \pi r^2$

SA = $2\pi(18.78)(50) + \pi(18.78)^2$

SA ≈ 7008 ft^2

Shape by Shape:

one circle, one rectangle

circle: πr^2

$\pi(18.78)^2 = 1108$

rectangle: circumference · height

$2\pi r \cdot h$

$2\pi(18.78)(50)$

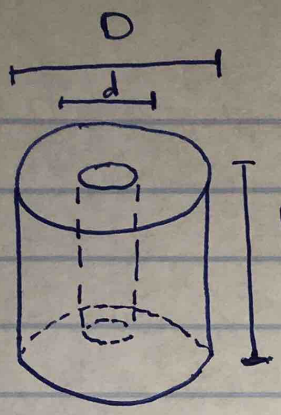
5900

*now determine the # of gallon cans: 7008 ft^2 ÷ 320 ft^2 = 21.9

*since we can't buy .9 of a can, bump this up to 22 cans

22 cans × $18 = $396

(13)



SA = LA + 2 · Area of Base

*since there is a cut out in the middle it is taking area away from the top and bottom BUT it also adds more surface area to the shape inside the roll!

Area of Top and Bottom: $2(\pi(3)^2 - \pi(1)^2) = 2(8\pi) = 16\pi$

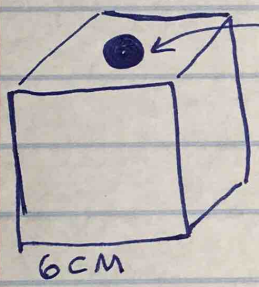
LA outside roll: $LA = 2\pi r \cdot h \rightarrow 2\pi(3)(5) = 30\pi$

LA inside roll: $LA = 2\pi r \cdot h \rightarrow 2\pi(1)(5) = 10\pi$

$SA = 16\pi + 30\pi + 10\pi$

$SA = 56\pi \text{ in}^2$

(14)



d = 2cm so r = 1cm

*similar to #13 ..... the hole takes SA away from the top & bottom but adds surface area inside the shape

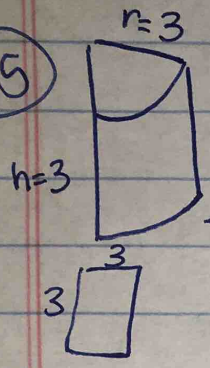
Area of Top + Bottom: $2(6 \cdot 6 - \pi(1)^2) = 2(36 - \pi) = 72 - 2\pi$

LA outside: LA = Perimeter · Height $\rightarrow 24 \cdot 6 = 144$

LA inside: $LA = P \cdot H \rightarrow LA = 2\pi r \cdot h \rightarrow 2\pi(1)(6) = 12\pi$

$SA = 72 - 2\pi + 144 + 12\pi$

$SA = 216 + 10\pi \text{ cm}^2$

(15) 

90° hunk of cheese → 1/4 of original cylinder

*we have 1/4 of our usual surface area BUT we also add 2 new rectangles on the inside of the slice!

Top & Bottom: $\frac{1}{4}(2\pi r^2) \rightarrow \frac{1}{4}(2\pi 3^2) = \frac{9\pi}{2}$

Curved Side: LA = 1/4(Perimeter of Base · Height)

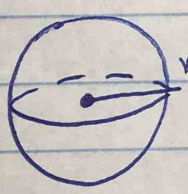
$\frac{1}{4}$(circumference · Height)

$\frac{1}{4}(2\pi r h)$

$\frac{1}{4}(2\pi 3 \cdot 3) = \frac{9\pi}{2}$

2 Rectangles inside: $2(3 \cdot 3) = 18$

$SA = \frac{9\pi}{2} + \frac{9\pi}{2} + 18$ $\quad$ $SA = 18 + 9\pi \text{ in}^2$

(27) 

$SA = 4\pi r^2$

$SA = 4\pi(3)^2$

$SA = 36\pi \text{ cm}^2$

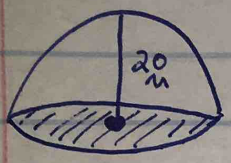
(28) 

$SA = 4\pi r^2$

$SA = 4\pi(\sqrt{3}/2)^2$

$SA = 4\pi \cdot 3/4$

$SA = 3\pi \text{ units}^2$

(29) 

*draw the height of the dome.... notice that you've drawn a line from the center to the outer edge... aka a RADIUS! → r = 20 m

Area of the FLOOR:  the floor is just a circle so use $A = \pi r^2$

$A = \pi(20)^2$

$A = 400\pi\ m^2$

*it takes 5 gallons of paint for the floor then we can find the # of m^2 one gallon can cover:

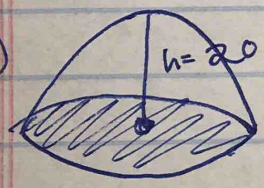
$\frac{400\pi}{5} = 80\pi\ m^2$ per gallon

SA inside the dome: ½ a sphere → $\frac{1}{2}(4\pi r^2)$

$\frac{1}{2}(4\pi(20)^2)$

$= 800\pi\ m^2$

# of gallons needed: $\frac{800\pi}{80\pi} =$ **10 gallons**

(30) 

*the height is the same as the radius!

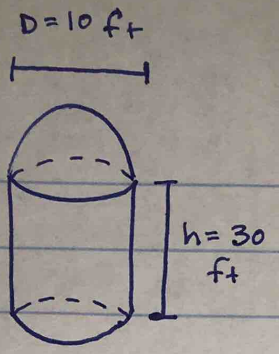
Area of the GROUND: 

$A = \pi r^2$

$A = \pi(20)^2$

$A = 400\pi\ m^2$

(31)



painting everything but the floor

SA = LA of cylinder + Area of Dome

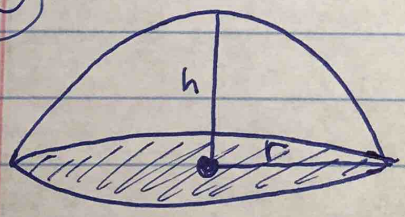
- Cylinder: LA = Perimeter of Base · Height
  LA = Circumference · Height
  $LA = 2\pi rh$
  $LA = 2\pi(5)(30) = 300\pi$
- Dome: ½ a sphere → $SA = \frac{1}{2}(4\pi r^2)$
  $SA = \frac{1}{2} \cdot 4 \cdot \pi \cdot 5^2$
  $SA = 50\pi$

Total $SA = 300\pi + 50\pi$
$SA = 350\pi \text{ ft}^2$

# of gallons: $\frac{350\pi}{280} = 3.9$ * we can't buy .9 of a gallon so bump it up!

4 gallons

(32)



$A = 1000 \text{ ft}^2$ .... notice that is says AREA, not SURFACE AREA!

$1000 = \pi r^2$
$318.31 = r^2$
$17.84 = r$ * r & h are the same!

h = 17.8 feet