HW SOL 8.4

March 14, 2018 9:19 AM

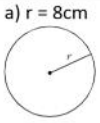
Name: Key **Date:**

Math 8 HW Section 8.4 Surface Areas of Cylinders

Circles: $C = 2\times\pi\times r$ or $C = \pi\times d$ $A = \pi\times r\times r$ or $A = \pi\times r^2$ Cylinder: $SA = 2\times\pi r^2 + 2\pi r\times h$

1. Given each circle, find the circumference and area. Show your calculations:

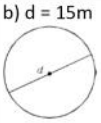
a) r = 8cm



Area: $\pi(8)^2$ → $64\pi\ cm^2$ → $= 201.06\ cm^2$

Circumference: $2\pi R$ → $16\pi\ cm$ → $= 50.265\ cm$

b) d = 15m $R = 7.5m$



Area: $A = \pi(7.5)^2$ → $A = 56.25\pi\ cm^2$ → $A = 176.71\ cm^2$

Circumference: $C = \pi d$ → $C = 15\pi$ → $= 47.12cm$

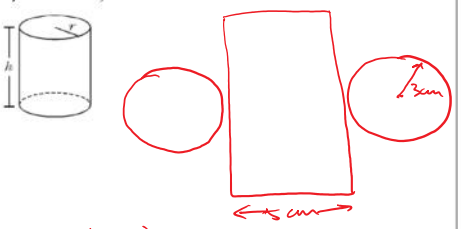
c) r = 25m

Area: $A = \pi(25)^2$ → $A = 625\pi$ → $A = 1,963.495m^2$

Circumference: $C = 2\pi(25)$ → $= 50\pi$ → $= 157.08cm$

2. Find the surface area of the following cylinders. Draw a net with the space provided:

a) $h = 5cm$, $r = 3cm$



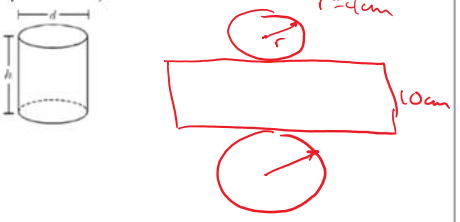
$SA = 2(\pi(3^2)) + 2\pi(3)(5)$

$= 18\pi + 30\pi$

$= 48\pi\ cm^2$

$= 150.796\ cm^2$

b) $h = 10cm$, $diameter = 8cm$



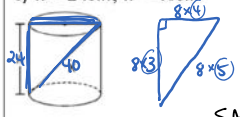
$S.A = 2(\pi\cdot 4^2) + 2\pi(4)(10)$

$= 32\pi + 80\pi$

$= 112\pi\ cm^2$

$= 351.858\ cm^2$

c) $h = 24cm$, $x = 40cm$



$24^2 + d^2 = 40^2$

$576 + d^2 = 1600$

$d^2 = 1024$

$d = 32$

$r = 16cm$

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

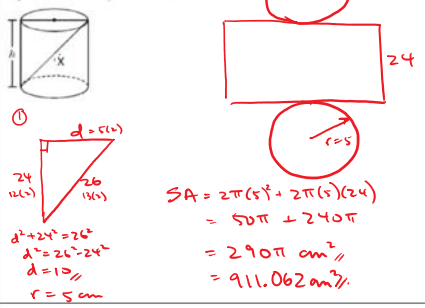
$= 2\pi(16)^2 + 2\pi(16)(24)$

$= 512\pi + 768\pi$

$= 1280\pi\ cm^2$

$= 4,021.239\ cm^2$

d) $h = 24cm$, $x = 26cm$



$d^2 + 24^2 = 26^2$

$d^2 = 26^2 - 24^2$

$d = 10$

$r = 5cm$

$SA = 2\pi(5^2) + 2\pi(5)(24)$

$= 50\pi + 240\pi$

$= 290\pi\ cm^2$

$= 911.062\ cm^2$

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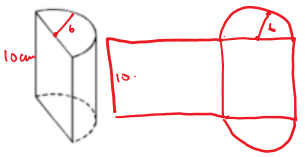
3. What shape is the lateral side of a cylinder? What is the equation for the area of the lateral side?

RECTANGLE ⇒ $2\pi R \times h$

4. How is the circumference of the circle on top of a cylinder related to the dimensions of the lateral side?

THE CIRCUMFERENCE IS THE LENGTH OF THE LATERAL SIDE

5. The solid shown was formed by cutting a circular cylinder in half. If the base has a radius of 6cm and the height is 10cm, what is the total surface area of the solid? Draw a net for the solid



$SA = \pi R^2 + \frac{2\pi R}{2} \times h + 10 \times d$

$= \pi(3^2) + \pi(6)10 + 10 \times (12)$

$= 36\pi + 60\pi + 120$

$= 96\pi + 120 \text{ cm}^2$

6. If the surface area of a cylinder is $2009.6 cm^2$ and the radius is 10cm, what is the height?

$2\pi R^2 + 2\pi Rh = 2009.6 \text{ cm}^2$

$2 \times \pi (10^2) + 2 \times \pi \times 10 \times h = 2009.6 \text{ cm}^2$

$628.31 + 62.831h = 2009.6$

$62.831h = 2009.6 - 628.31$

$62.831h = 1381.29$

$h = \frac{1381.29}{62.831}$

$h = 21.98 \text{ cm}$

$10(5) = 50$

$5 = \frac{50}{10}$

$62.831 \times h = 1381.29$

$h = \frac{1381.29}{62.831}$

7. Ancient Babylonians used Cylinder seals as roller stamps. They would engrave images and writings on the seals and then roll it on clay to make an impression. If the seal is 5cm in length and has a radius of 3cm, how much writing surface does it have?

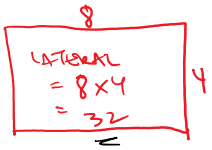
① WE ARE ONLY CALCULATING THE LATERAL SIDE

$SA = 2\pi(3)(5)$

$= 30\pi \text{ cm}^2$

$= 94.25 \text{ cm}^2$

8. Challenge: If the dimensions of the lateral side of a cylinder is $8cm$ by $4cm$, what are the possible surface areas of the cylinder?

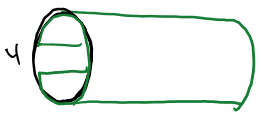


$8 = 2\pi R$

$4 = \pi \times R$

$\frac{4}{3.14159} = R$

$1.273239 = R$



$4 = 2\pi R$

$2 = \pi R$

$\frac{2}{\pi} = R$

$A = \pi(R^2) \times 2$

$A = \pi(1.273239)^2 \times 2$

$A = 10.185 \text{ cm}^2$

$A = 2\pi R^2$

$A = 2 \times \pi \left(\frac{2}{\pi}\right)^2$

$A = \frac{8}{\pi} \text{ cm}^2$

$SA = 10.185 + 32 \text{ cm}^2$

$SA = 42.185 \text{ cm}^2$

$SA = \frac{8}{\pi} + 32 \text{ cm}^2$

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