

Circle and Cylinder Word Problems

Oct 20-08:19

Circumference of a Circle

- The Circumference of a circle can be calculated using the formulae:
- $C = 2\pi r$ or $C = \pi d$
- Where ***d*** is the diameter, ***r*** is the radius and **$\pi = 3.14$** to 2 decimal places

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Area of a Circle

- The Area of a circle can be worked out by using the formula:

$$A = \pi r^2$$

- Where r is the radius and $\pi = 3.14$ to 2 decimal places

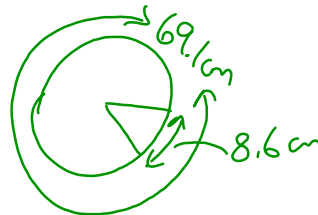
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You ordered a pepperoni pizza with a circumference of 69.1 cm.

a) What is the area of the pizza, to the nearest square centimetre?

b) The pizza is cut into slices from the centre. If each slice measures 8.6 cm along the curved edge, how many slices will there be? Explain.

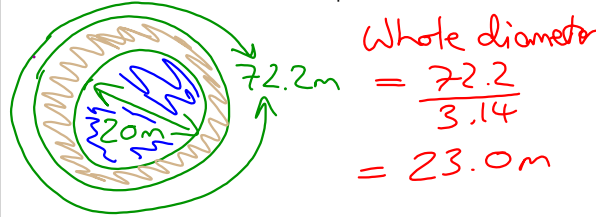
$$\begin{aligned}
 \text{a) } C &= 2\pi r \\
 69.1 &= 2 \times 3.14 \times r \\
 \frac{69.1}{2} &= 3.14 \times r \\
 \frac{34.55}{3.14} &= 3.14 \times r \\
 11 \text{ cm} &= r \\
 \text{Area} &= \pi r^2 \\
 &= 3.14 \times 11^2 \\
 &= 379.94 \text{ cm}^2 = 380 \text{ cm}^2
 \end{aligned}$$

(b)  # of slices

$$\begin{aligned}
 &= \frac{69.1}{8.6} \\
 &= 8 \text{ slices}
 \end{aligned}$$

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A circular pool with a diameter of 20 m was built with a surrounding circular deck. The circumference of the deck is 72.2 m. Calculate the width of the deck. What is the area of the pool and the area of the deck?



$$\begin{aligned} \text{Whole diameter} &= \frac{72.2}{3.14} \\ &= 23.0\text{m} \end{aligned}$$

$$\begin{aligned} 23 - 20 &= 3\text{m} \\ 3 \div 2 &= 1.5\text{m} \text{ width of the deck.} \end{aligned}$$

$$\begin{aligned} \text{Area pool} &= \pi r^2 \\ &= 3.14 \times 10^2 \\ &= 314\text{m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area complete [deck + pool]} &= \pi r^2 \\ &= 3.14 \times 11.5^2 \\ &= 415.265\text{m}^2 \end{aligned}$$

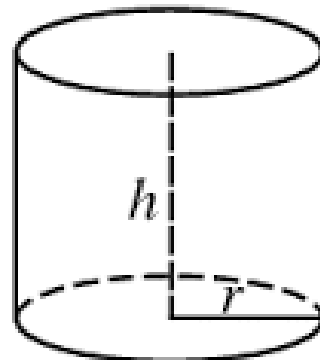
$$\begin{aligned} \text{Area deck} &= \text{Area complete} - \text{Area pool} \\ &= 415.26 - 314 \\ &= 101.26\text{m}^2 \end{aligned}$$

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To calculate the volume we need to know the height of the cylinder and its radius.

$$\text{Volume}_{\text{cylinder}} = \pi r^2 h$$

The " πr^2 " represents the area of the circle and the " h " represents the height of the stack of circles.

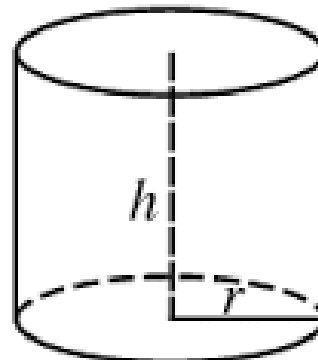


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To calculate the surface area we again need to know the height of the cylinder and its radius.

$$\text{Surface Area}_{\text{cylinder}} = 2\pi r^2 + 2\pi rh$$

The " $2\pi r^2$ " represents the area of the two circles (top and bottom) and the " $2\pi rh$ " represents the area of the rectangle that joins the circles together.



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Online Cylinder Calculator!

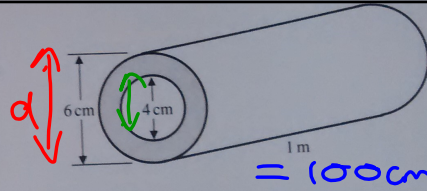
http://www.numberempire.com/cylinder_calculator.php

Yes, just put in the radius and height and it will calculate the volume and surface area for you.

Great for checking your answers, not so great for tests when you have to show your working.

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10. A cylindrical metal pipe has external diameter of 6 cm and internal diameter of 4 cm. Calculate the volume of metal in a pipe of length 1 m. If 1 cm^3 of the metal weighs 8 g, find the weight of the pipe.



$$V = \pi r^2 h$$

$$d = 6 \text{ cm}$$

$$r = 3 \text{ cm}$$

$$\begin{aligned} V &= \pi r^2 h \\ &= 3.14 \times 3^2 \times 100 \\ &= 2826 \text{ cm}^3 \end{aligned}$$

$$d = 4 \text{ cm}$$

$$r = 2 \text{ cm}$$

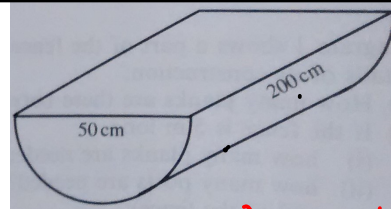
$$\begin{aligned} V &= \pi r^2 h \\ &= 3.14 \times 2^2 \times 100 \\ &= 1256 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume}_{\text{metal}} &= 2826 - 1256 \\ &= 1570 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Weight} &= 1570 \times 8 \div 1000 \\ &= 12560 \text{ g} \Rightarrow 12.56 \text{ kg} \end{aligned}$$

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If you had to paint the outside of this trough, what size area would you have to paint?



Find SA of half the cylinder.

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

$$\begin{aligned} SA_{\text{whole}} &= 2\pi r^2 + 2\pi r h \\ &= 2 \times 3.14 \times 25^2 + 2 \times 3.14 \times 25 \times 200 \\ &= 3925 + 31400 \\ &= 35325 \text{ cm}^2 \end{aligned}$$

But I want HALF of the cylinder
 $\Rightarrow 35325 \div 2 = 17662.5 \text{ cm}^2$

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