Volume and Surface Area (Cylinders)

This worksheet focuses on cylinders. Remember to use π in your calculations. Give all non-exact answers correct to 3 significant figures and remember to include units.

Volume Calculations

1. Calculate the volume of a cylinder with a radius of $7\ \text{cm}$ and a height of $10\ \text{cm}$.

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2. A cylinder has a diameter of $18\ \text{m}$ and a height of $4\ \text{m}$. Calculate its volume.

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3. A cylindrical pipe has a radius of $0.5\ \text{m}$ and a length of $5\ \text{m}$. Calculate the volume of the pipe in cubic metres.

Surface Area Calculations

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4. Find the total surface area of a closed cylindrical tin with a radius of $3\ \text{cm}$ and a height of $8\ \text{cm}$.

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5. A water tank is shaped like an open-top cylinder (no lid). The diameter is $2\ \text{m}$ and the height is $3.5\ \text{m}$. Calculate the external surface area that needs painting (excluding the base).

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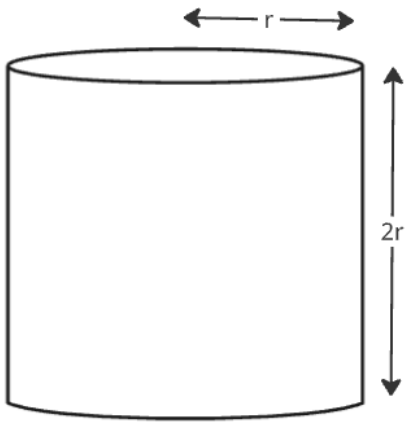
6. The curved surface area of a cylinder is $150\ \text{cm}^2$. If the radius is $4\ \text{cm}$, what is the height of the cylinder?

Reverse and Application Problems

7. A cylindrical container has a volume of $800\ \text{cm}^3$. If the height is $15\ \text{cm}$, what is the radius of the container?

8. A standard can of baked beans has a height of $10\ \text{cm}$ and a diameter of $7\ \text{cm}$. How many cubic centimetres of baked beans can the can hold?

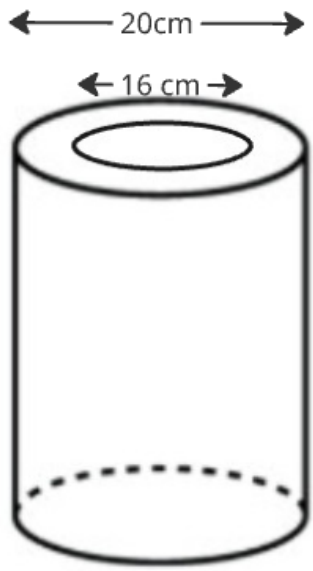
9. A company is designing a new cylindrical can that must have a volume of $330\ \text{ml}$ ($330\ \text{cm}^3$). If the company decides to make the height equal to the diameter ($h = 2r$), calculate the radius of the can.



10. An outdoor roller has a length of $1.5\ \text{m}$ and a diameter of $0.8\ \text{m}$. Calculate the area of the ground covered when the roller completes exactly 5 full revolutions.
(Hint: This is 5 times the curved surface area.)

11. A company is manufacturing closed cylindrical storage tanks. Each tank must have a total surface area of exactly $100\ \text{m}^2$. If the radius of the tank is fixed at $2\ \text{m}$, find the required height of the tank.

12. A metal pipe has an outer diameter of $20\ \text{cm}$ and an inner diameter of $16\ \text{cm}$. The pipe is $3\ \text{m}$ long. Calculate the volume of the metal used to make the pipe in cm^3.



13. A large cylindrical drum has a height of $1.2\ \text{m}$ and a radius of $0.6\ \text{m}$. If the drum is used to store fuel, and the cost of the fuel is $\$1.50$ per litre, what is the total value of the fuel when the drum is completely full? ($1\ \text{m}^3 = 1000\ \text{L}$)

14. An outdoor roller has a length of $1.5\ \text{m}$ and a diameter of $0.8\ \text{m}$. Calculate the area of the ground covered when the roller completes exactly 5 full revolutions.
(Hint: This is 5 times the curved surface area.)