

Mixed Volume and Surface Area Problems

(a)	(b)	(c)	(d)
<p>The surface area of a sphere with radius 10 cm is equal to the curved surface area of a cylinder with the same radius as the sphere and height $h\text{ cm}$. Find the height h.</p> <p style="text-align: center;">$h = 27\text{ cm}$</p>	<p>A cylinder with height $h\text{ cm}$ and radius 6 cm has the same volume as a sphere with radius 9 cm. Find the value of h.</p> <p style="text-align: center;">$h = 20\text{ cm}$</p>	<p>A metal cylinder is to be melted down and turned into spheres with radius 3 cm. The cylinder has a radius of 12 cm and a height of 25 cm. How many whole spheres can be made?</p> <p style="text-align: center;">100 spheres</p>	<p>A cone with slanted height 25 cm and radius 8 cm has the same curved surface area as a hemisphere. Find the radius r of the hemisphere.</p> <p style="text-align: center;">$r = 10\text{ cm}$</p>
(e)	(f)	(g)	(h)
<p>A cylinder has a radius r and height $15r$. A sphere has radius $3r$. Find the ratio of the volume of the sphere to the volume of the cylinder in its simplest form.</p> <p style="text-align: center;">$12 : 5$</p>	<p>A hemisphere with radius $2r$ has the same total surface area as a cylinder with radius r. Find the height of the cylinder in terms of r.</p> <p style="text-align: center;">$h = 5r$</p>	<p>A cone has a radius of $\frac{3}{2}x$ and a height of $3x$. A sphere has a radius of kx. The ratio of the volume of the cone to the volume of the sphere is $4 : 1$. Find the value of k as a fraction in its simplest form.</p> <p style="text-align: center;">$k = \frac{3}{4}$</p>	<p>A hemisphere of radius $(r + 2)$ is attached to the base of a cone with radius $(r + 2)$ and slant height $5r$. The total surface area of the compound shape is 273π. Find the volume of the compound shape.</p> <p style="text-align: center;">$r = 5$ $V = \frac{1862\pi}{3}$</p>