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| **Mixed Volume and Surface Area Problems** |
| **(a)** | **(b)** | **(c)** | **(d)** |
| 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 $h cm$. Find the height $h$. | A cylinder with height $h cm$ and radius $6 cm$ has the same volume as a sphere with radius $9 cm$. Find the value of $h$. | 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? | 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. |
| **(e)** | **(f)** | **(g)** | **(h)** |
| 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. | 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 $r$. | 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.  | 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. |