

Do Now

Please work together on this Do-Now. Thank you!



A great circle of a sphere is the intersection of the sphere and a plane that passes through the center point of the sphere.

If Earth were separated into two hemispheres (half spheres) at the equator as shown, then the circumference of the great circle would be the distance around the Equator.

The surface area of a sphere is equal to four times the area of the great circle: $SA = 4\pi r^2$

If the Equator is approximately 24,900 miles long, what is a rough estimate of the surface area of Earth?



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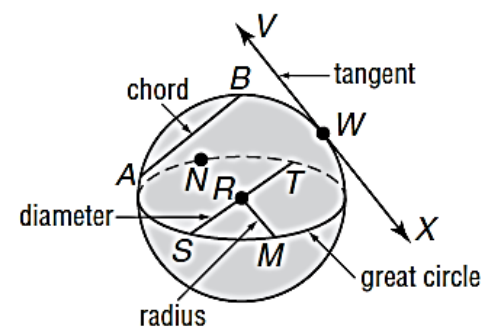
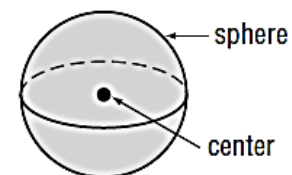
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Properties of Spheres A **sphere** is the locus of all points that are a given distance from a given point called its **center**.

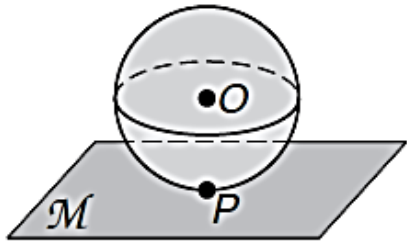
Here are some terms associated with a sphere.

- A **radius** is a segment whose endpoints are the center of the sphere and a point on the sphere.
- A **chord** is a segment whose endpoints are points on the sphere.
- A **diameter** is a chord that contains the sphere's center.
- A **tangent** is a line that intersects the sphere in exactly one point.
- A **great circle** is the intersection of a sphere and a plane that contains the center of the sphere.
- A **hemisphere** is one-half of a sphere. Each great circle of a sphere determines two hemispheres.

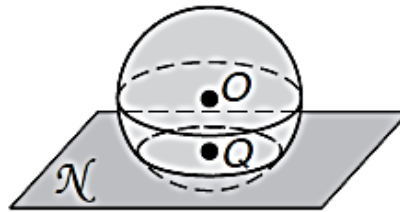


\overline{RS} is a radius. \overline{AB} is a chord.
 \overline{ST} is a diameter. \overline{VX} is a tangent.
The circle that contains points S , M , T , and N is a great circle; it determines two hemispheres.

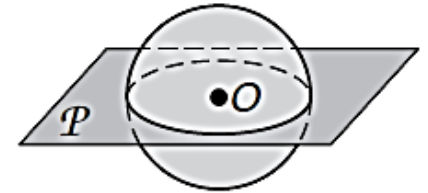
A sphere can intersect a plane at a single point, in a circle, or in the great circle. (see below)



The intersection of plane \mathcal{M} and sphere O is point P .



The intersection of plane \mathcal{N} and sphere O is circle Q .



The intersection of plane \mathcal{P} and sphere O is circle O .

The Surface Area of a sphere is equal to four times the area of the sphere's great circle.

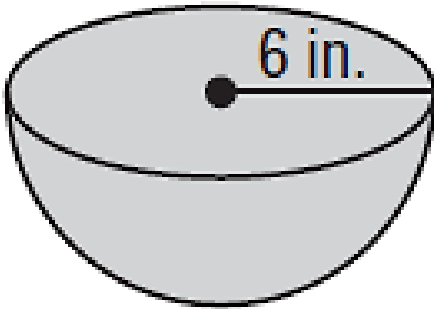
$$SA_{sphere} = 4\pi r^2$$

Find the exact surface area of a sphere with a diameter of 18 yards.

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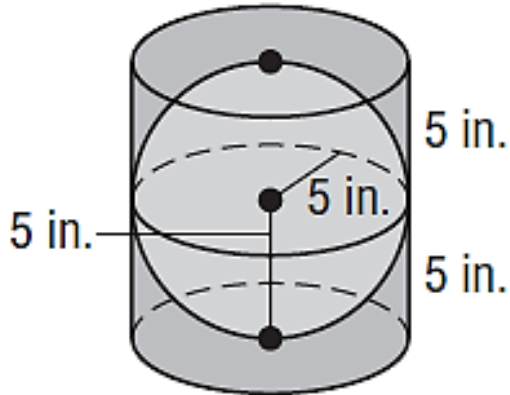
$$SA_{sphere} = 4\pi r^2$$

Find the surface area of a hemisphere with a radius of 12 cm. (estimate using $\pi \approx 3.14$).



The Volume of a sphere can be found using the Volume formula: $V_{sphere} = \frac{4}{3}\pi r^3$

A sphere with radius 5 inches just fits inside a cylinder. What is the difference between the volume of the cylinder and the volume of the sphere? (estimate using $\pi \approx 3.14$ and round your answer to the nearest cubic inch).



The Volume of a sphere can be found using the Volume formula: $V_{sphere} = \frac{4}{3}\pi r^3$

Find the exact volume of this three-dimensional solid.

