

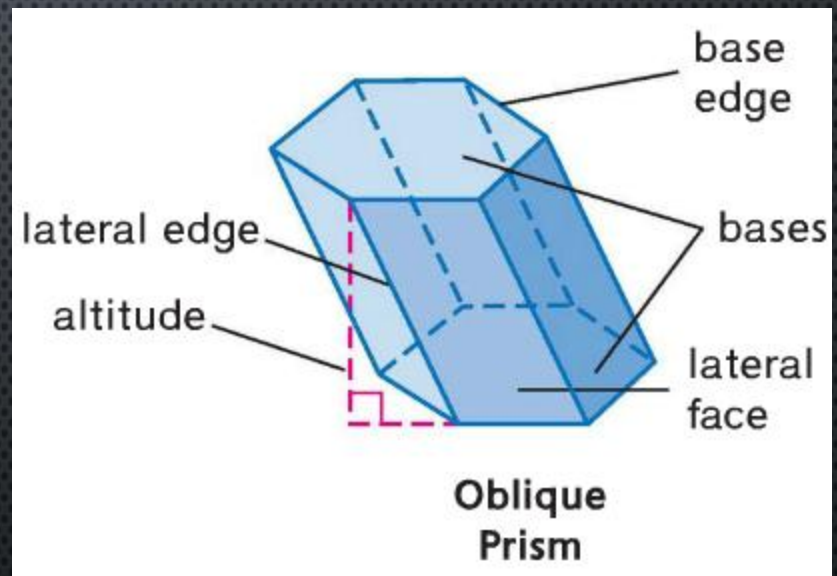
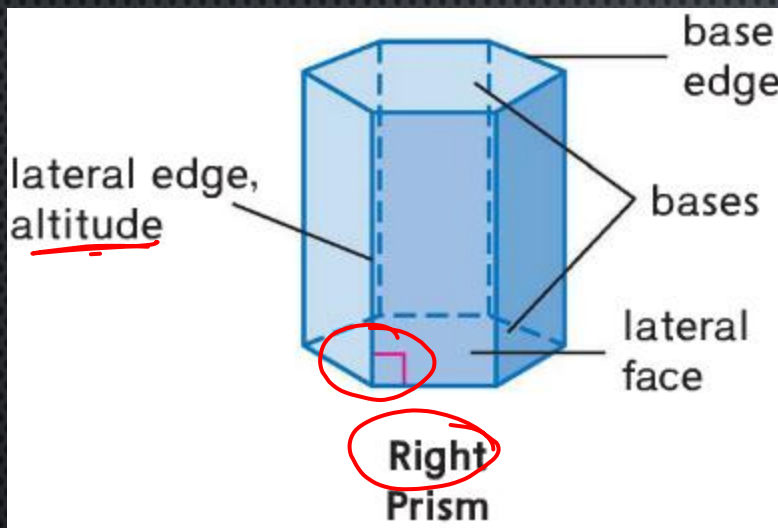
SURFACE AREA OF:

PRISMS AND CYLINDERS

PYRAMIDS AND CONES

SPHERES

LATERAL AREAS AND SURFACE AREAS OF PRISMS



LATERAL AREA OF A PRISM

- THE LATERAL AREA L OF A RIGHT PRISM IS $L=Ph$, WHERE h IS THE HEIGHT OF THE PRISM AND P IS THE PERIMETER OF A BASE.

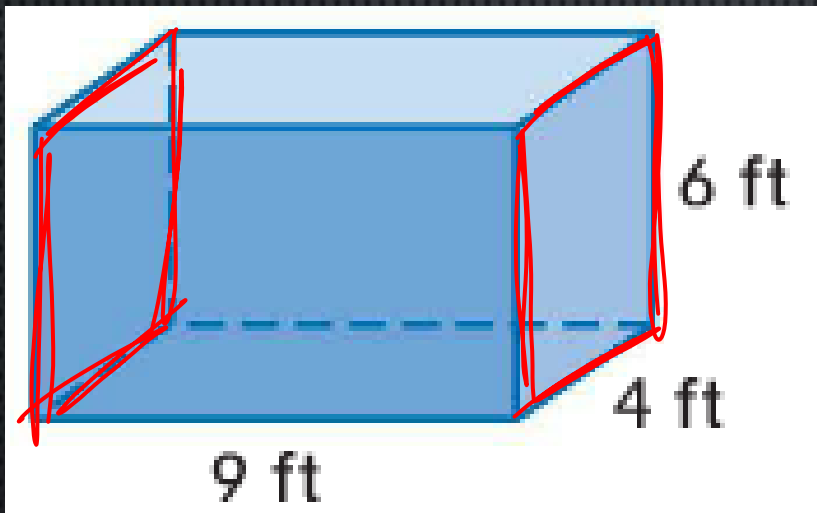
SURFACE AREA OF A PRISM

- THE SURFACE AREA S OF A RIGHT PRISM IS $S = L+2B$, WHERE L IS THE LATERAL AREA AND B IS THE AREA OF A BASE.

EXAMPLES

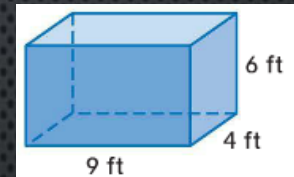
$$\begin{aligned} S &= L + 2B \\ &= Ph + 2B \\ &= (20)(9) + 2(24) \end{aligned}$$

- FIND THE SURFACE AREA OF THE PRISM.



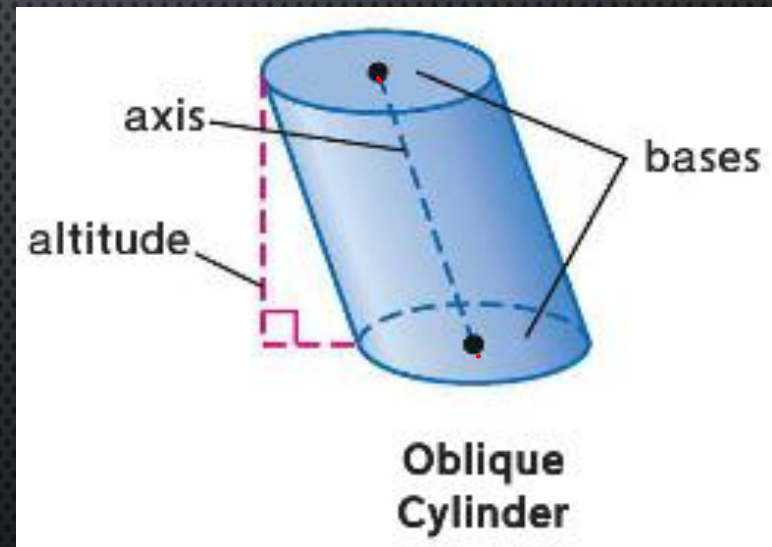
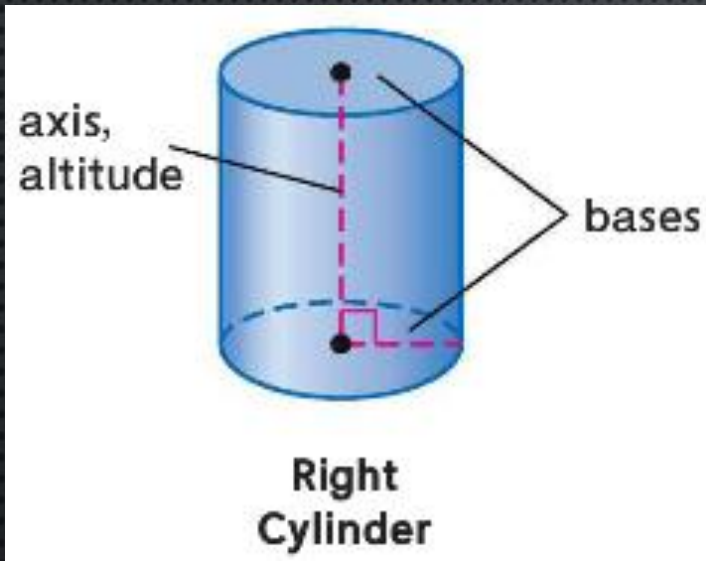
EXAMPLES

- FIND THE SURFACE AREA OF THE PRISM.



- $S = L + 2B; L = PH \rightarrow S = PH + 2B$
- $P = 2L + 2B = 2(4) + 2(6) = 8 + 12 = 20$
- $B = 6 * 4 = 24; H = 9$
- $S = (20)(9) + 2(24)$
- $= 180 + 48$
- $= 228$

LATERAL AREAS AND SURFACE AREAS OF CYLINDERS



LATERAL AREA OF A CYLINDER

- THE LATERAL AREA L OF A RIGHT CYLINDER IS $L = 2\pi RH$, WHERE R IS THE RADIUS OF A BASE AND H IS THE HEIGHT.

SURFACE AREA OF A CYLINDER

- THE SURFACE AREA S OF A RIGHT CYLINDER IS

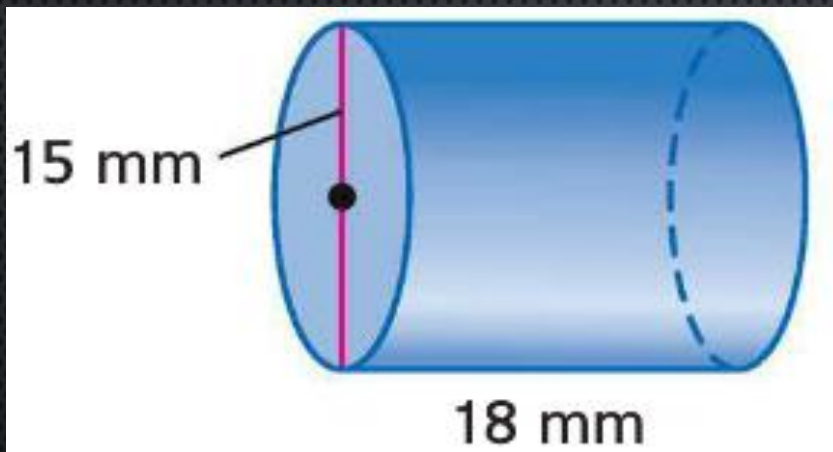
$$S = 2\pi RH + 2\pi R^2,$$

WHERE R IS THE RADIUS OF A BASE AND H IS THE HEIGHT.

EXAMPLES

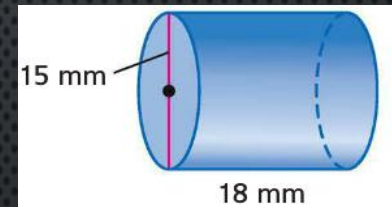
$$\begin{aligned}L &= 2\pi rh \\ &= 2\pi(7.5)(18) \\ &= \pi(15)(18)\end{aligned}$$

- FIND THE LATERAL AREA AND THE SURFACE AREA OF THE CYLINDER. ROUND TO THE NEAREST TENTH.



EXAMPLES

- FIND THE LATERAL AREA AND THE SURFACE AREA OF THE CYLINDER. ROUND TO THE NEAREST TENTH.



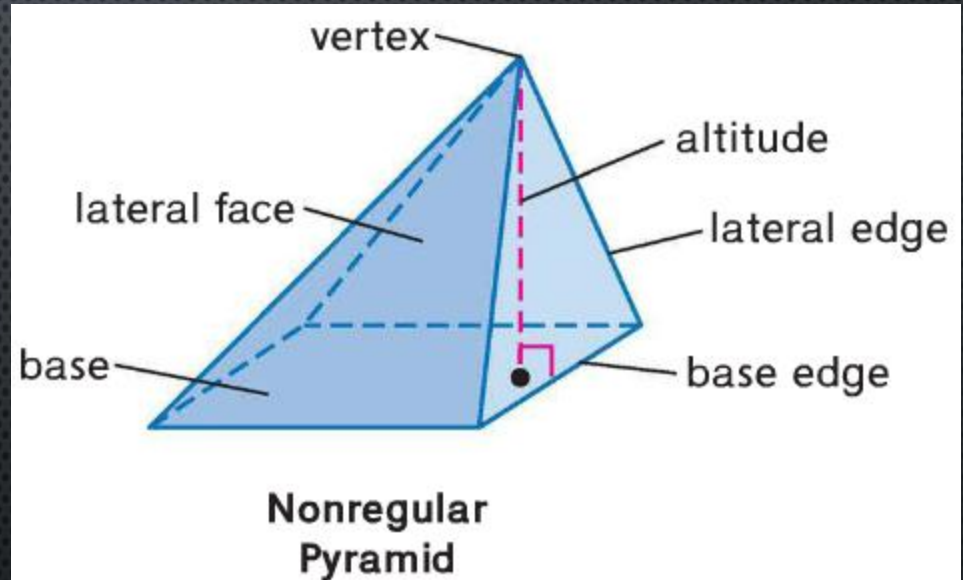
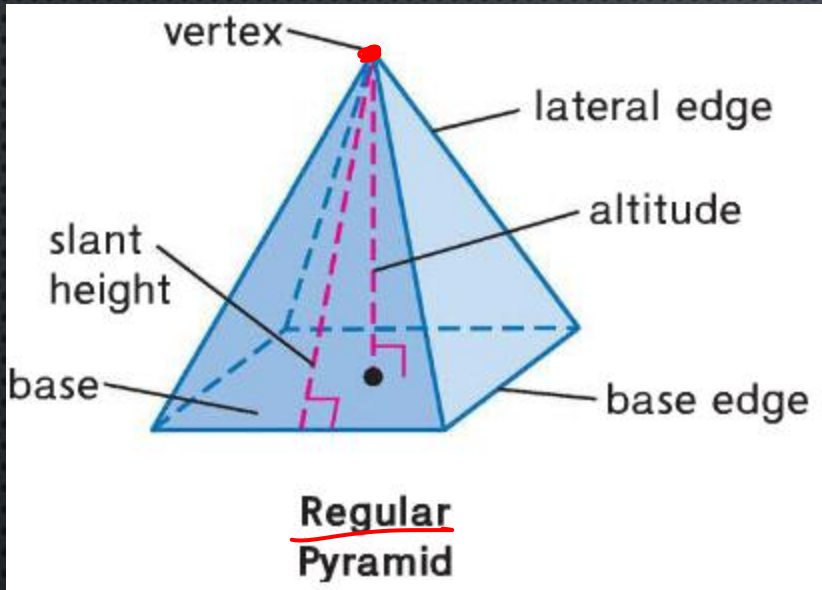
- $L = 2\pi RH; R = \frac{15}{2} = 7.5, H = 18$
- $L = 2\pi(7.5)(18) = 270\pi = 848.2$

- $S = L + 2B; B = \pi R^2$
- $S = 270\pi + 2\pi(7.5^2)$
- $S = 270\pi + 112.5\pi = 382.5\pi = 1201.7$

slant
height



PYRAMIDS

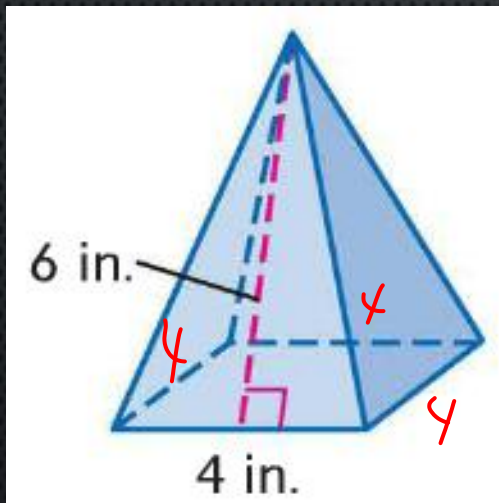


LATERAL AREA OF A REGULAR PYRAMID

- THE LATERAL AREA L OF A REGULAR PYRAMID IS
 $L = \frac{1}{2}P\ell$, WHERE P IS THE PERIMETER OF THE
BASE AND ℓ IS THE SLANT HEIGHT.

EXAMPLES

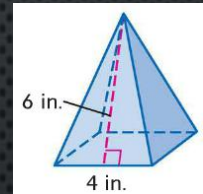
- FIND THE LATERAL AREA OF THE SQUARE PYRAMID.



$$\begin{aligned}L &= \frac{1}{2} P l \\ &= \frac{1}{2} (16)(6) \\ &= 48\end{aligned}$$

EXAMPLES

- FIND THE LATERAL AREA OF THE SQUARE PYRAMID.



- $L = \frac{1}{2}P\ell; P = 4 * 4 = 16; \ell = 6$
- $L = \frac{1}{2}(16) * (6) = 48$

SURFACE AREA OF A REGULAR PYRAMID

- THE SURFACE AREA S OF A REGULAR PYRAMID IS $S = \frac{1}{2}P\ell + B$, WHERE P IS THE PERIMETER OF THE BASE, ℓ IS THE SLANT HEIGHT, AND B IS THE AREA OF THE BASE.

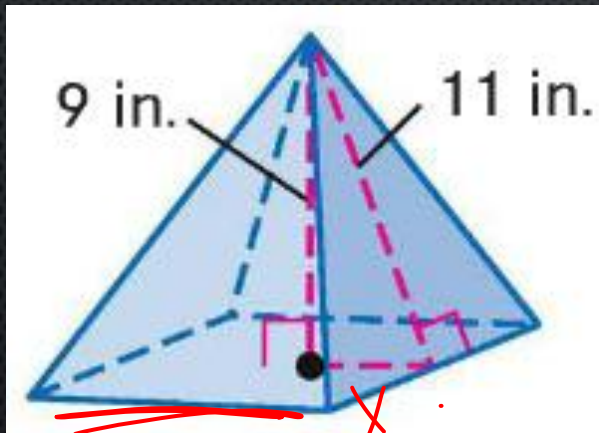
EXAMPLES

$$S = L + B$$

$$= \frac{1}{2}Pl + B$$

$$\frac{1}{2}(8\sqrt{40})(11) + (2\sqrt{40})^2$$

- FIND THE SURFACE AREA OF THE PYRAMID TO THE NEAREST TENTH.



$$2\sqrt{40}$$

$$A^2 + B^2 = C^2$$

$$x^2 + 9^2 = 11^2$$

$$x^2 + 81 = 121$$

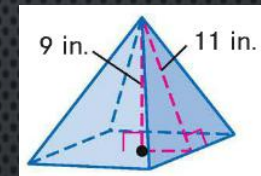
$$-81 \quad -81$$

$$\sqrt{x^2} = \sqrt{40}$$

$$x = \pm\sqrt{40}$$

EXAMPLES

- FIND THE SURFACE AREA OF THE PYRAMID TO THE NEAREST TENTH.



- $S = \frac{1}{2}P\ell + B$
- $11^2 - 9^2 = 40; \sqrt{40} = \frac{1}{2}s \rightarrow s = 2\sqrt{40} = 4\sqrt{10}$
- $P = 4 * 4\sqrt{10} = 16\sqrt{10}; B = (4\sqrt{10})^2 = 160$
- $S = \frac{1}{2}(16\sqrt{10})(11) + 160$
- $S = 438.3$

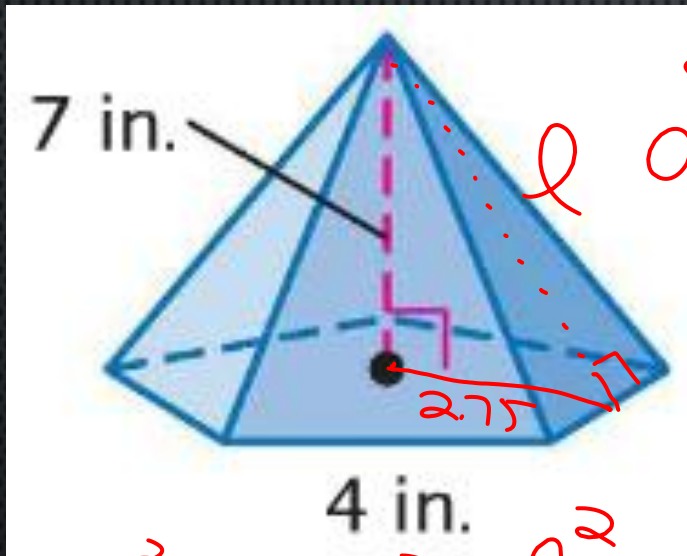
$$S = \frac{1}{2}Pl + B$$

$$= \frac{1}{2}(20)(7.52) + 27.5$$

$$= 75.2 + 27.5$$

EXAMPLES

- FIND THE SURFACE AREA OF THE REGULAR PYRAMID TO THE NEAREST TENTH.



$$\tan 36 = \frac{2}{a}$$

$$a = \frac{2}{\tan 36} = 2.75$$

$$7^2 + 2.75^2 = l^2$$

$$\sqrt{49 + 7.56} = \sqrt{56.56} = l$$

$$l = 7.52$$

$$A = \frac{1}{2}Pa$$

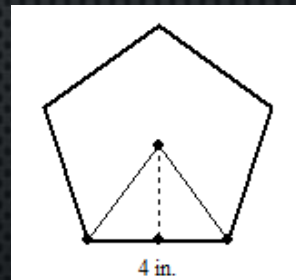
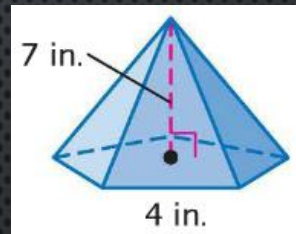
$$= \frac{1}{2}(20)(2.75)$$

$$= 27.5$$

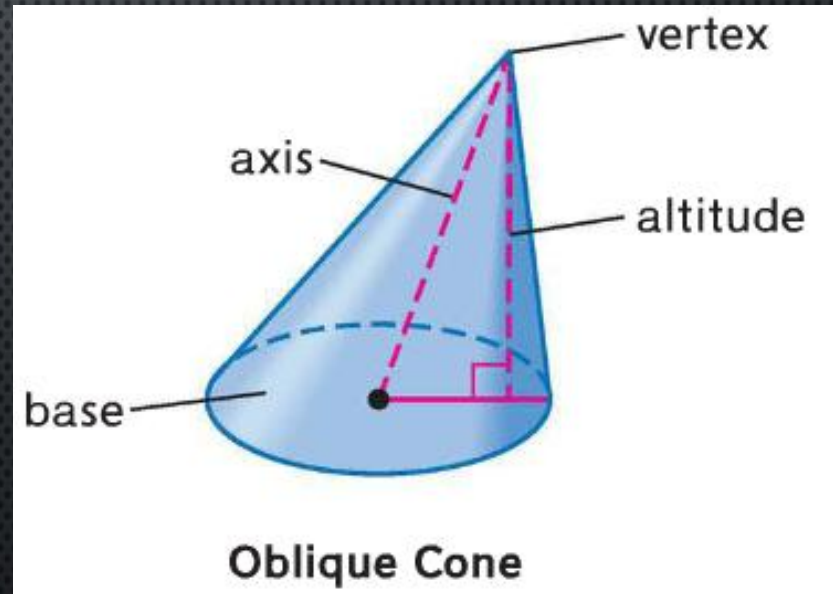
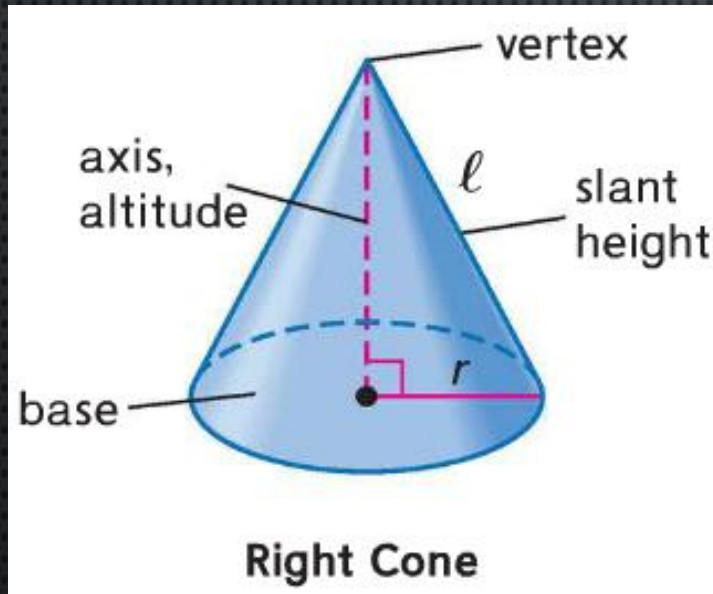
EXAMPLES

- FIND THE SURFACE AREA OF THE REGULAR PYRAMID TO THE NEAREST TENTH.

- $S = \frac{1}{2}P\ell + B$; $P = 4 * 5 = 20$
- $B = \frac{1}{2}PA = \frac{1}{2}(20)(2.75) = 27.5$
- $\ell = \sqrt{2.75^2 + 7^2} = 7.5$
- $S = \frac{1}{2}(20)(7.5) + 27.5$
- $S = 102.5$



LATERAL AREA AND SURFACE AREA OF CONES

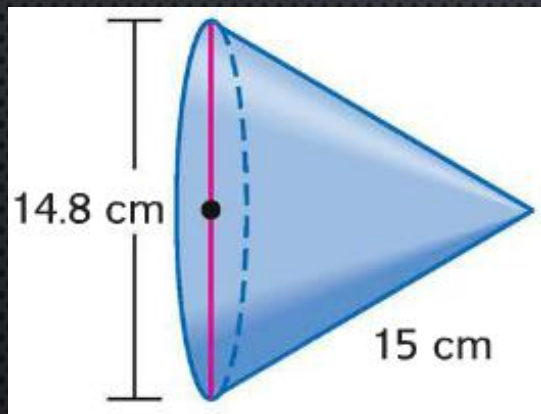


LATERAL AND SURFACE AREA OF A CONE

- THE LATERAL AREA L OF A RIGHT CIRCULAR CONE IS $L = \pi R \ell$, WHERE R IS THE RADIUS OF THE BASE AND ℓ IS THE SLANT HEIGHT.
- THE SURFACE AREA S OF A RIGHT CIRCULAR CONE IS $S = \pi R \ell + \pi R^2$, WHERE R IS THE RADIUS OF THE BASE AND ℓ IS THE SLANT HEIGHT.

EXAMPLES

- FIND THE LATERAL AND SURFACE AREA OF A CONE WITH A DIAMETER OF 14.8 CENTIMETERS AND A SLANT HEIGHT OF 15 CENTIMETERS.



$$L = \pi r l$$
$$= \pi (7.4)(15)$$

$$S = L + \pi r^2$$
$$= \pi (7.4)(15) + \pi (7.4)^2$$

EXAMPLES

- FIND THE LATERAL AND SURFACE AREA OF A CONE WITH A DIAMETER OF 14.8 CENTIMETERS AND A SLANT HEIGHT OF 15 CENTIMETERS.

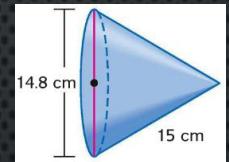
- $L = \pi R \ell; R = \frac{14.8}{2} = 7.4;$

- $L = \pi(7.4)(15) = 111\pi = 348.7$

- $S = \pi R \ell + \pi R^2$

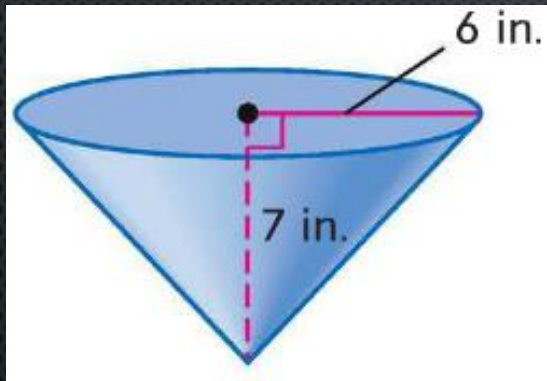
- $S = 111\pi + \pi(7.4^2)$

- $S = 111\pi + \pi(54.76) = 165.76\pi = 520.75$



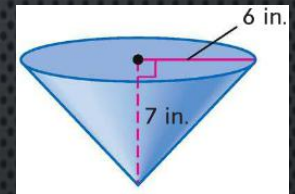
EXAMPLES

- FIND THE LATERAL AND SURFACE AREAS OF THE CONE. ROUND TO THE NEAREST TENTH.



EXAMPLES

- FIND THE LATERAL AND SURFACE AREAS OF THE CONE. ROUND TO THE NEAREST TENTH.



- $L = \pi R \ell$; $R = 6$;
- $\ell = \sqrt{6^2 + 7^2} = 9.2$
- $L = \pi(6)(9.2) = 55.2\pi = 173.4$

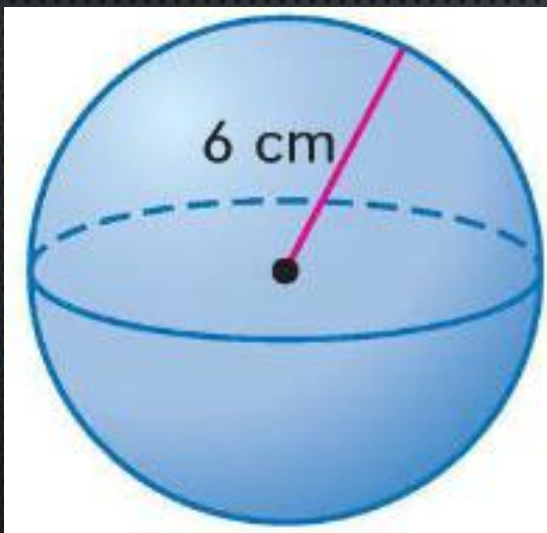
- $S = \pi R \ell + \pi R^2$
- $S = 55.2\pi + \pi(6^2)$
- $S = 55.2\pi + \pi(36) = 91.2\pi = 286.5$

SURFACE AREA OF A SPHERE

- THE SURFACE AREA S OF A SPHERE IS $S = 4\pi R^2$, WHERE R IS THE RADIUS.

EXAMPLES

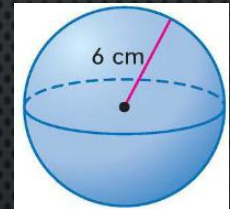
- FIND THE SURFACE AREA OF THE SPHERE TO THE NEAREST TENTH.



$$\begin{aligned}S &= 4\pi r^2 \\ &= 4\pi(6)^2 \\ &= 144\pi \\ &= 452.4\end{aligned}$$

EXAMPLES

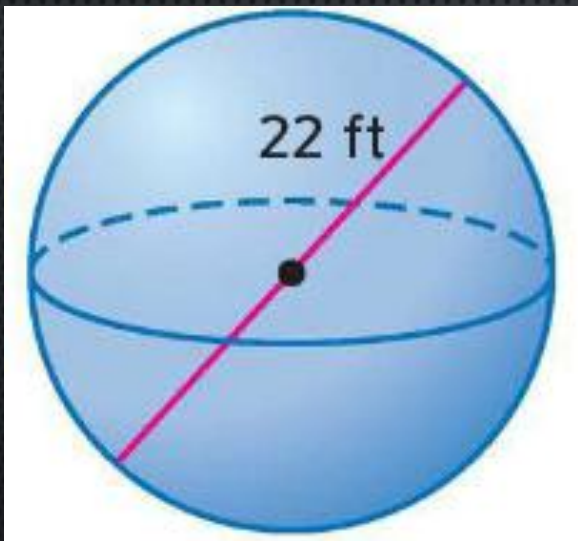
- FIND THE SURFACE AREA OF THE SPHERE TO THE NEAREST TENTH.



- $S = 4\pi R^2; R = 6 \rightarrow 4\pi(6)^2$
- $S = 144\pi = 452.4$

EXAMPLES

- FIND THE SURFACE AREA OF THE SPHERE TO THE NEAREST TENTH.



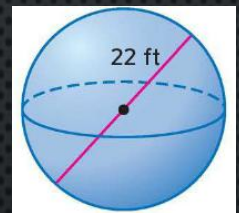
$$\begin{aligned} S &= 4\pi r^2 \\ &= 4\pi (11)^2 \\ &= 484\pi \\ &= 1520.5 \end{aligned}$$

EXAMPLES

- FIND THE SURFACE AREA OF THE SPHERE TO THE NEAREST TENTH.

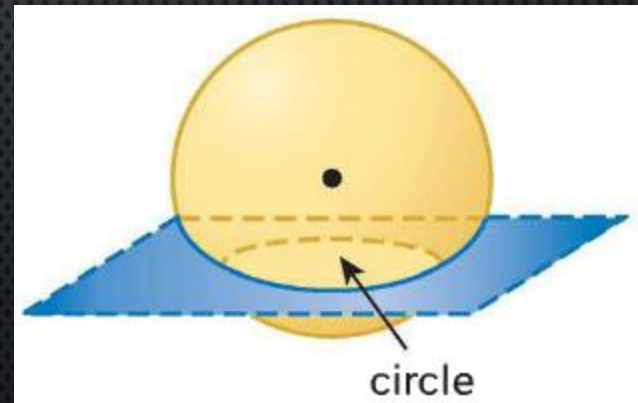
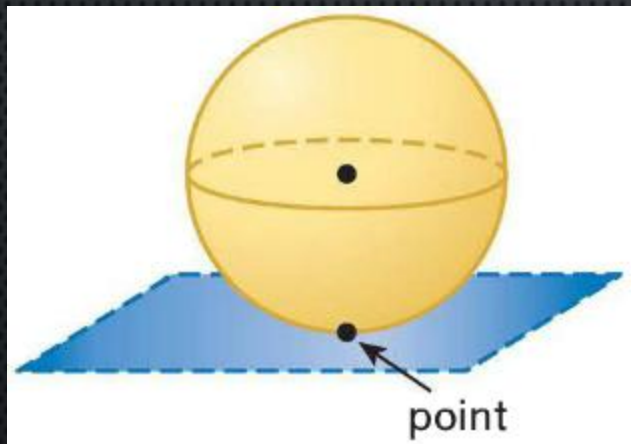
- $S = 4\pi R^2$; $R = \frac{22}{2} = 11 \rightarrow S = 4\pi 11^2$

- $S = 484\pi = 1520.5$



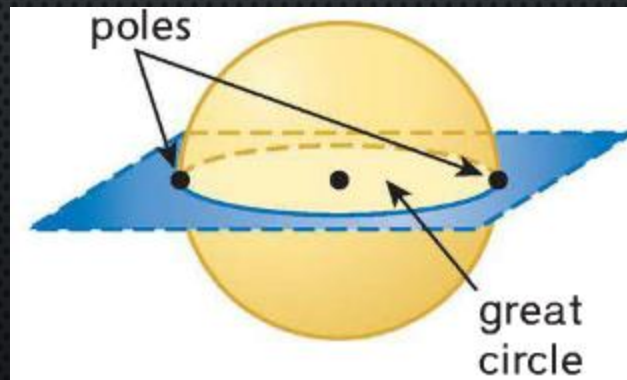
SPHERES

- A PLANE CAN INTERSECT A SPHERE IN A POINT OR IN A CIRCLE.



SPHERES

- IF THE CIRCLE CONTAINS THE CENTER OF THE SPHERE, THE INTERSECTION IS CALLED A GREAT CIRCLE.
- THE ENDPOINTS OF A DIAMETER OF A GREAT CIRCLE ARE CALLED POLES.



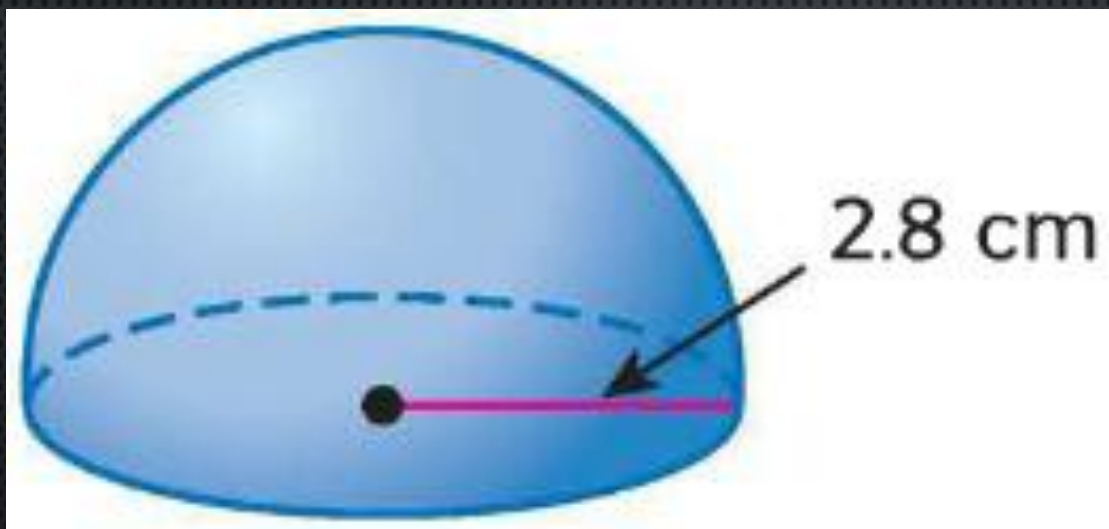
GREAT CIRCLE

- SINCE A GREAT CIRCLE HAS THE SAME CENTER AS THE SPHERE AND ITS RADII ARE ALSO RADII OF THE SPHERE, IT IS THE LARGEST CIRCLE THAT CAN BE DRAWN ON A SPHERE.
- IT SEPARATES A SPHERE INTO TWO CONGRUENT HALVES, CALLED HEMISPHERES.

$$S_{\text{Hemi}} = 3\pi r^2$$

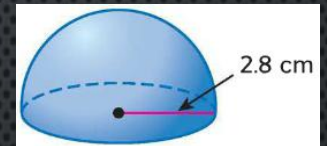
EXAMPLES

- FIND THE SURFACE AREA OF THE HEMISPHERE.



EXAMPLES

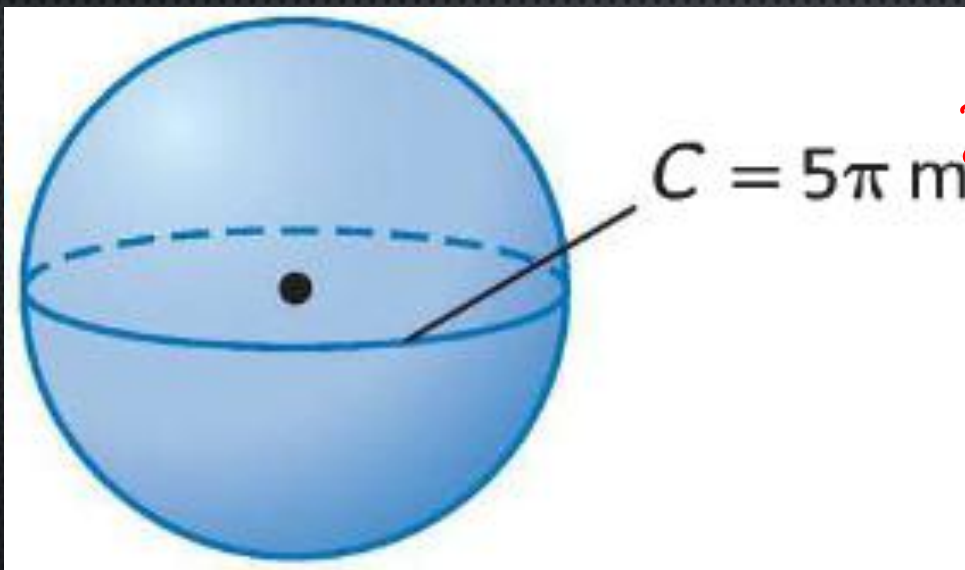
- FIND THE SURFACE AREA OF THE HEMISPHERE.



- $S = 2\pi R^2 + \pi R^2$ OR $S = 3\pi R^2$
- $S = 3\pi(2.8)^2 = 3\pi(7.84)$
- $S = 23.52\pi = 73.89$

EXAMPLES

- FIND THE SURFACE AREA OF THE SPHERE.



$$S = 4\pi r^2$$

$$C = 2\pi r$$

~~$$S = 2\pi r$$~~

$$25 = r$$

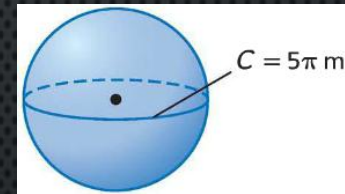
EXAMPLES

- FIND THE SURFACE AREA OF THE SPHERE.

- $S = 4\pi R^2; C = 2\pi R \rightarrow R = \frac{C}{2\pi} = \frac{5\pi}{2\pi} = 2.5$

- $S = 4\pi(2.5)^2 = 4\pi(6.25)$

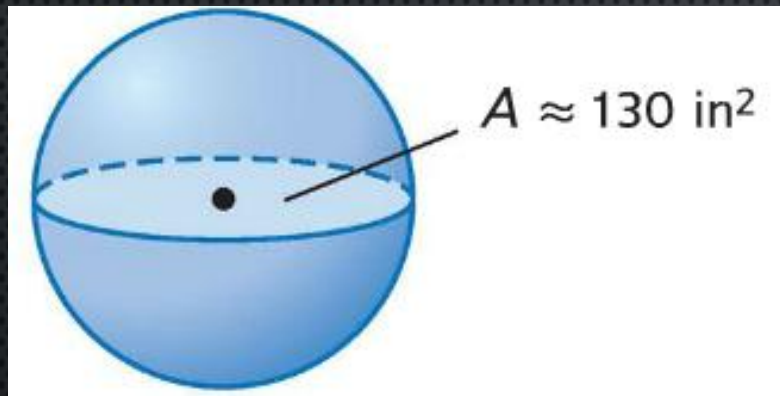
- $S = 25\pi = 78.54$



$$S = 4\pi r^2$$

EXAMPLES

- FIND THE SURFACE AREA OF A SPHERE IF THE AREA OF THE GREAT CIRCLE IS APPROXIMATELY 130 SQUARE INCHES.



EXAMPLES

- FIND THE SURFACE AREA OF A SPHERE IF THE AREA OF THE GREAT CIRCLE IS APPROXIMATELY 130 SQUARE INCHES.
- $S = 4\pi R^2; \pi R^2 = 130$
- $S = 4 * 130 = 520$

