

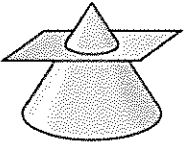
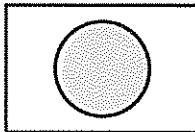
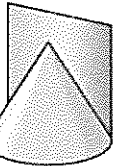
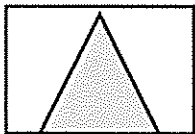
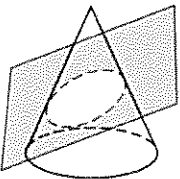
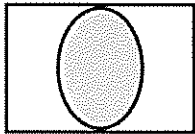
12-1 Cross Sections

Representations of Three-Dimensional Figures

Cross Sections The intersection of a solid and a plane is called a **cross section** of the solid. The shape of a cross section depends upon the angle of the plane.

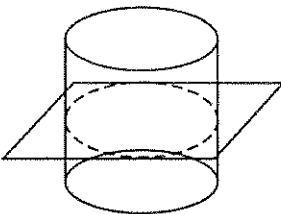
Example

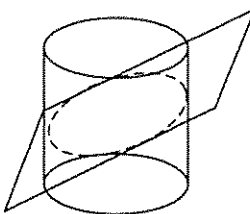
There are several interesting shapes that are cross sections of a cone. Determine the shape resulting from each cross section of the cone.

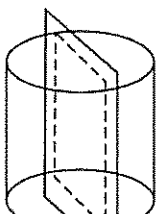
- a.  If the plane is parallel to the base of the cone, then the resulting cross section will be a circle. 
- b.  If the plane cuts through the cone perpendicular to the base and through the center of the cone, then the resulting cross section will be a triangle. 
- c.  If the plane cuts across the entire cone, then the resulting cross section will be an ellipse. 

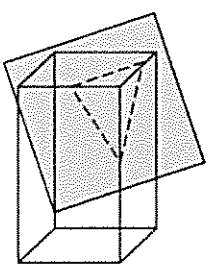
Exercises

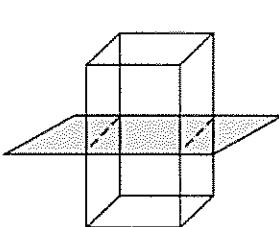
Describe each cross section.

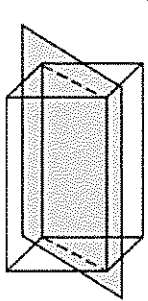
1. 
Circle

2. 
ellipse

3. 
Rectangle

4. 
Triangle

5. 
Square

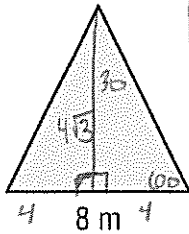
6. 
rectangle

12-1 Area Practice

Areas of Regular Polygons and Composite Figures

Find the area and perimeter of each regular polygon. Round to the nearest tenth.

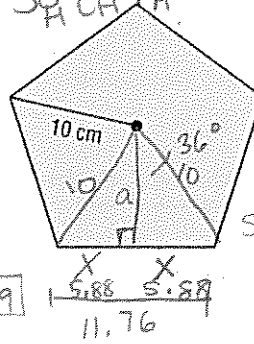
1.



~~A = 27.7 m²~~
~~P = 24 m~~

$A = \frac{1}{2}(8)(4\sqrt{3})$
 $16\sqrt{3} \approx 27.7$

2.

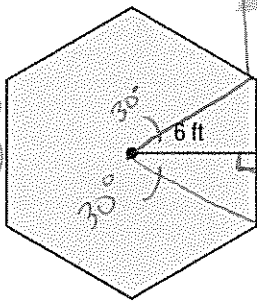


$\frac{360}{5} = 72$
 $\cos 36 = \frac{9}{10}$
 $10 \cdot \cos 36 = a$
 $a \approx 8.09$

~~A = 237.8 cm²~~
~~P = 58.8 cm~~

$A = \frac{1}{2}(10 \cdot \cos 36)(5 \cdot 2 \cdot 10 \cdot \sin 36)$
 $A = \frac{1}{2}(8.09)(58.78)$
 $A \approx 237.8 \text{ cm}^2$
 $x = 10 \cdot \sin 36$
 $x \approx 5.88$

3.

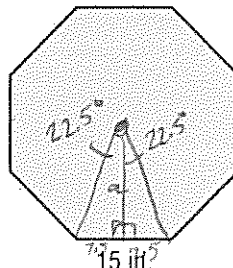


~~A = 124.7 ft²~~
~~P = 41.6 ft~~

$A = \frac{1}{2}(6)(2\sqrt{3})$
 $\frac{1}{2}(6)(2\sqrt{3})$
 ≈ 124.7

$\frac{360}{6} = 60$
 $\frac{6\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$
 $P = 6 \cdot 4\sqrt{3} = 24\sqrt{3} \approx 41.569$

4.

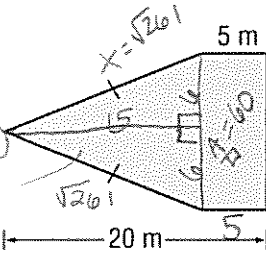


~~A = 1086.4 in²~~
~~P = 120 in~~

$A = \frac{1}{2}(\frac{7.5}{\tan 22.5})(120)$
 $\frac{1}{2}(18.1)(120)$
 ≈ 1086.396
 $\tan 22.5 = \frac{7.5}{a}$
 $a = \frac{7.5}{\tan 22.5}$
 $a \approx 18.1$
 $\frac{360}{8} = 45$

Find the area and perimeter of each figure. Round to the nearest tenth if necessary.

5.

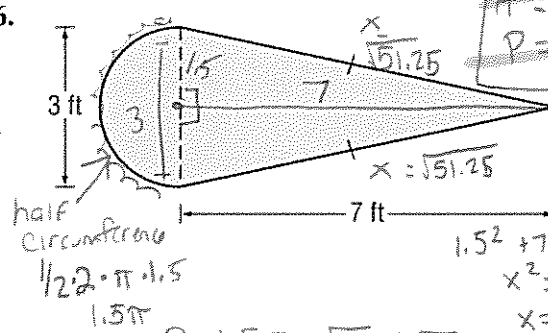


~~A = 150 m²~~
~~P = 54.3 m~~

$A_{\Delta} = \frac{1}{2}(12)(5)$
 $A_{\square} = 90$
Total A = 90 + 60 = 150

$6^2 + 15^2 = x^2$
 $x^2 = 261$
 $\sqrt{261}$

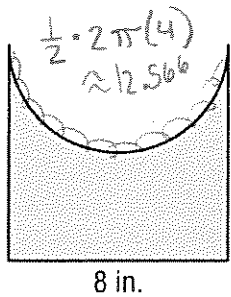
6.



~~A = 14 ft²~~
~~P = 19.0 ft~~

half circumference $\frac{1}{2} \cdot 2 \cdot \pi \cdot 1.5$
 1.5π
 $1.5^2 + 7^2 = x^2$
 $x^2 = 51.25$
 $x = \sqrt{51.25}$
 $P = 1.5\pi + \sqrt{51.25} + \sqrt{51.25}$
 ≈ 19.03
 $\frac{1}{2} \text{Area}_{\square} + A_{\Delta}$
 $\frac{1}{2}\pi(1.5)^2 + \frac{1}{2}(7)(15)$
 ≈ 14.0

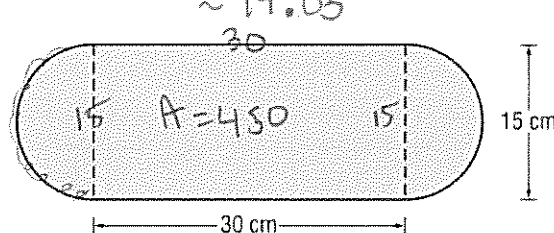
7.



~~A = 38.9 in²~~
~~P = 36.6 in~~

$\frac{1}{2} \cdot 2\pi(4) \approx 12.566$
 $P = 8 + 8 + 8 + 12.566 \approx 36.6 \text{ in}$
 $A = A_{\square} - \frac{1}{2}A_{\circ}$
 $64 - \frac{1}{2}\pi(4)^2$
 $64 - 8\pi \approx 38.87$

8.



~~A = 626.7 cm²~~
~~P = 107.1 cm~~

$A = A_{\square} + A_{\circ}$
 $450 + \pi(7.5)^2$
 $450 + 56.25\pi$
 ≈ 626.71
 $P = 30 + 30 + C_{\circ}$
 $60 + 2\pi(7.5)$
 $60 + 15\pi$
 ≈ 107.12