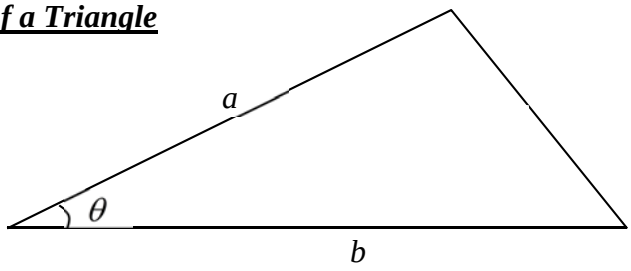
7.2 Area of a Triangle

Area of a Triangle



Recall the area of a triangle is given by $A = \frac{1}{2}bh$.

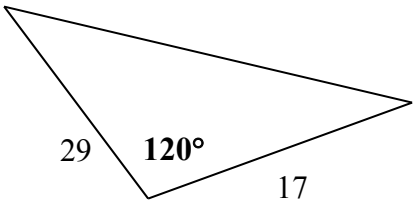
Area of a triangle

$$A = \frac{1}{2}ab\sin\theta$$

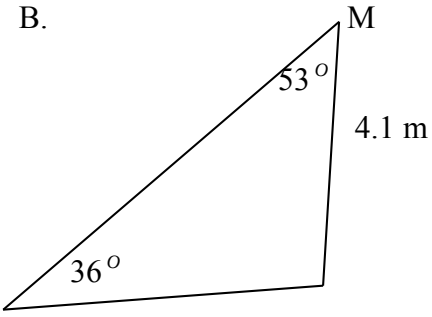
a, b are the lengths of two sides of a triangle
θ is the angle ***between*** them.

Example 1: Find the exact area of the triangle.

A.



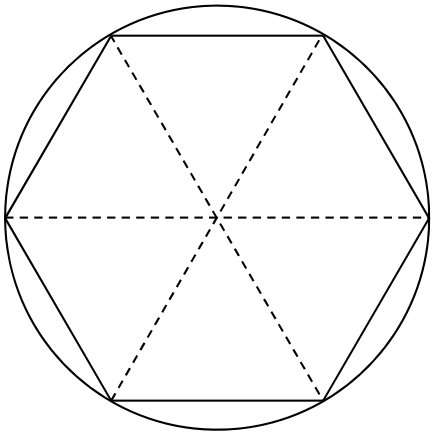
B.



Example 2: Find the area of an isosceles triangle with legs measuring 7 inches and base angles measuring 22.5 ° .

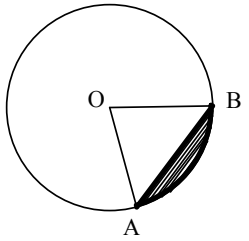
Example 3: If the area of ΔABC is 20 square centimeters, a = 16 cm and c = 5 cm, find all possible measures for angle B.

Example4: A regular hexagon is inscribed in a circle of radius 4m. Find the area of the hexagon. Note: Regular means that all of the sides are equal and all of the angles are equal



Example 5: Find the area of a regular octagon with side length 16. (Hint: we will use trigonometry and the geometric version of area of a triangle).

Area of a Segment of a Circle
You can also find the area of a segment of a circle. The shaded area of the picture is an example of a segment of a circle.



To find the area of a segment, find the area of the sector with central angle θ and radius OA. Then find the area of ΔOAB . Then subtract the area of the triangle from the area of the sector.

Example 6: Find the area of the segment of the circle with radius 8 and central angle measuring $\frac{\pi}{4}$. Give an exact answer.

Example 7: In triangle ABC, the measure of Angle A is 2x, the length of AB is 5, and the length of AC is $\frac{\sqrt{6}}{4}$. If $\sin(x) = \frac{1}{5}$, what is the area of the triangle.