Section 6.3
Solutions and Hints

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for the book:
<u>Precalculus, Mathematics for Calculus 4th Edition</u>
by James Stewart, Lothar Redlin and Saleem Watson.

This should look very familiar. It is building on what you learned in sections 5.1 and 5.2.

A new formula you should know is:

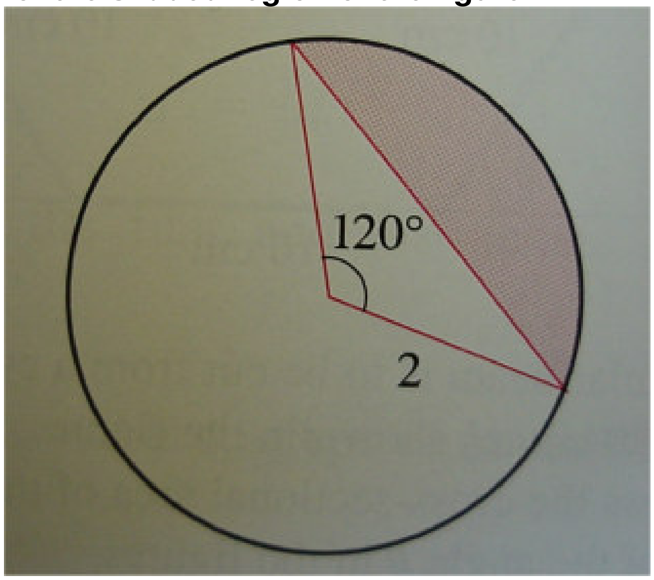
The **<u>area of a triangle</u>** with sides of length a and b = A = ½*a*b*sin(θ),
where θ is the angle between sides a and b.

52. Find the area of an equilateral triangle with side length of 10.

Recall an equilateral triangle means that all sides are the same length and all the angles are 60°. Thus

$$A = \tfrac{1}{2} \cdot 10 \cdot 10 \cdot \sin(60^\circ) = 50 \cdot \sin(60^\circ) \approx \mathbf{43.3}$$

54. Find the area of the shaded region of the figure:



For this you need 2 formulas:

The **area of a triangle** with sides of length a and b = A = ½*a*b*sin(θ), where θ is the angle between sides a and b.

and from section 6.1:

The **area of a sector of a circle** = A = ½*r^2*θ ,

where θ is the central angle of the sector measured in radians and r of course is the radius of the circle.

Let the area of the triangle = $A_{triangle}$.
Let the area of the entire sector = A_{sector}.

And thus the area of the shaded region = A = $A_{sector} - A_{triangle}$.

Note: a = b = r = 2 (because the triangle sides are formed from the circle's center)

$A_{triangle}$ = ½*2*2*sin(120°) ~= 1.732

A_{sector} = ½ * 2^2 * [120° * (π radians / 180°)] ~= 4.18879

A ~= $A_{sector} - A_{triangle}$ = 4.18879 – 1.732 = **2.4567**.