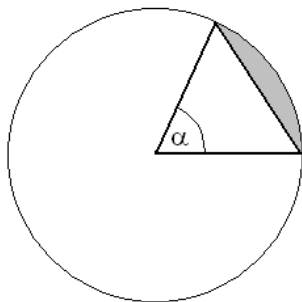


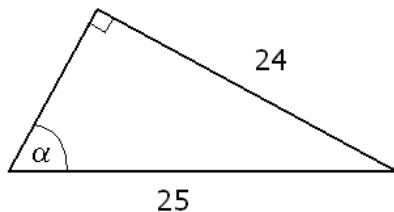
Problem Set 7

Use the π button on your calculator instead of typing in 3.14. Present exact values (preferred) or round approximations to three decimal places.

1. Convert 135° to radians.
2. The radius of the circle shown on the picture below is 5 cm and $\alpha = 60^\circ$. Find the area of the shaded region.



3. Find the exact value of each of the following expressions.
 - (a) $3 \sin 30^\circ \cos 60^\circ - 2 \sin 60^\circ \cos 30^\circ =$
 - (b) $2 \sin 60^\circ + 2 \sin 30^\circ - 2 \tan 45^\circ =$
 - (c) $\sin^2 16^\circ + \cos^2 16^\circ =$
4. Find the exact value of $\sin \beta$ if we know that $\sin \alpha = \frac{2}{3}$ and $\alpha + \beta = 90^\circ$.
5. Find the radius of a circle if we know that a sector subtended by a central angle of 67° has an area of 42 m^2 .
6. Find the polar coordinates of $(20, 21)$.
7. Find the rectangular coordinates of $(10, 28^\circ)$
8. Find the exact value for all six trigonometric function of α , based on the following picture.



9. Find the height of a tree if the angle of elevation of its top changes from 20° to 40° as the observer advances 75 ft towards its base.
10. The minute hand of a clock is 5 cm long. Find the speed of the top of the minute hand. Express your answer in meter per second.
11. Find the side of a regular polygon with 15 sides that is written in a circle of radius 2.

12. Phoenix, AZ and Salt Lake City, UT have approximately the same longitude. The radius of the earth is approximately 3960 miles. The latitude of Phoenix is 33.5° and that of Salt Lake City is 40.7° . Find the distance to the nearest mile between the two cities.
13. A 5.6 ft tall person is standing 40 ft away from a street light that is 28 ft tall. How long is her shadow?
14. Prove that if α is an acute angle in a right triangle, then $\sin \alpha + \cos \alpha > 1$.