

Problem Set 6

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. Use the unit square to find the exact values for

(a) $\sin 45^\circ =$

(b) $\tan 45^\circ =$

(c) $\sin^2 45^\circ + \cos^2 45^\circ =$

2. The radius of a circle is 8 m.

(a) Find the length of an arc subtended by a central angle of 20° .

(b) Find the area of a sector subtended by a central angle of 20° .

3. Find the polar coordinates for $(20, 15)$.

4. Find the rectangular coordinates for $(3, 41^\circ)$

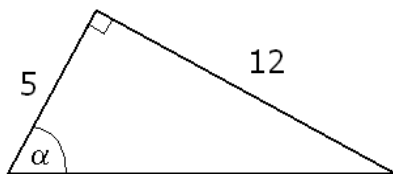
5. Convert 15° to radians. Round your answer to three decimal places.

6. Convert 1 radian to degrees.

7. Let ABC be a right triangle with sides a , b , and c . (c is the hypotenuse.) Express $\sin^2 \alpha + \cos^2 \alpha$ in terms of a , b , and c .

8. Find the angle that the straight line $y = \frac{2}{3}x + 5$ forms with the positive half of the x -axis.

9. Find the exact value for all six trigonometric function of α , based on the following picture.



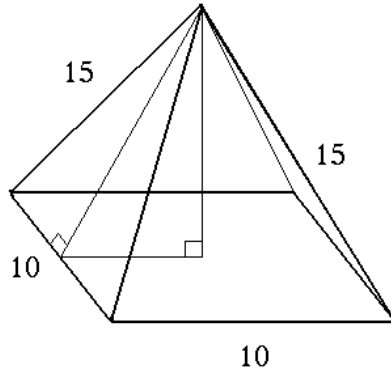
10. Find the radius of a circle if we know that a central angle of 70° subtends an arc of 12 in.

11. We are driving toward a tower. The angle of elevation is 28° . Then we drive 550 ft toward the tower. Now the angle of elevation is 40° . How tall is the tower?

12. Find the exact value of $2 \sin \frac{\pi}{4} \cos \frac{\pi}{4}$.

13. Green Bay, WI and Mobile, AL have approximately the same longitude. The radius of the earth is approximately 3960 miles. The latitude of Green Bay is 44.5° and that of Mobile is 30.7° . Find the distance to the nearest mile between the two cities.

14. The picture below shows a straight pyramid with a square base. The sides of the base are 10 in long. The other sides are 15 in long.



- (a) Find the height of a triangular edge.
(b) Use part a) to find the height of the pyramid.
15. Find the side of a regular polygon with 10 sides that is written in a circle of radius 28.
16. An object is traveling on a circular orbit of radius 4 meters. It completes 10 cycles in one minute. Find the speed of the object. Express your answer in meter per second.