

Exercises — Radian measure and further trigonometric functions

1. If $\cos a = 2/3$, what is $\sin a$?
2. If $\cos a = 4/5$, what is $\tan a$?
3. A right triangle has hypotenuse 5, base 4 and the angle between the base and the hypotenuse is a . Find $\tan a$, $\cot a$, $\sec a$ and $\csc a$.
4. A right triangle has a base of size 4 and height of size 5. Find the values of all the trigonometric functions of the base angle.
5. A line joining the coordinates $(0, 0)$ with $(3, -4)$ makes an angle a with the horizontal line through $(0, 0)$. Find $\tan a$, $\cot a$, $\sec a$ and $\csc a$.
6. A balloon is at an altitude of 200 feet above sea level and directly above the edge of a cliff. An observer on a beach sites the balloon through a telescope aimed at a 30 degree angle from the horizontal. How far is the balloon from the observer?
7. A surveying team measures an angle of ?? radians from a point A on a beach to a point B at the top of a cliff. If point A is 200 meters from the base of the cliff, how high is the cliff?
8. A crane is 80 feet long. For safety reasons it should never be lowered less than 55° from the horizontal. How high will the crane reach?
9. A tower casts a 120 foot shadow on horizontal ground from the sun when it makes an angle of 60 degrees. How tall is the tower?
10. Simplify $\sin x - \cos^2 x \sin x$.
11. Simplify $\tan^2 x \csc^2 x \cot^2 x \sin^2 x$.
12. Solve the equation $2\sin^2 x + 3\cos x = 0$ for $0 \leq x \leq \pi$.
13. Convert 45 degrees to radians.
14. Convert $\frac{5\pi}{9}$ radians to degrees.
15. Convert $\frac{1}{2}$ radian to degrees.
16. Find the length of an arc cut from a circle of radius 1 meter by an angle of 60 degrees placed at the center of the circle.
17. Find the length of an arc cut from a circle of radius 5 meters by an angle of 60 degrees placed at the center of the circle.
18. Through how many radians does the minute hand of a clock rotate in 50 minutes?