

## Trigonometry Practice Questions

### Trig Ratios

1. State the value of each of the following:

a)  $\sin 30^\circ$

b)  $\cos 60^\circ$

c)  $\tan 45^\circ$

d)  $\sec 45^\circ$

e)  $\csc 70^\circ$

f)  $\cot 30^\circ$

g)  $\sin 0^\circ$

h)  $\cos 0^\circ$

i)  $\tan 0^\circ$

2. Find the value of  $\theta$

a)  $\tan \theta = 1$

b)  $\cos \theta = \frac{1}{\sqrt{2}}$

c)  $\sin \theta = \frac{1}{2}$

d)  $\sec \theta = 2$

e)  $\csc \theta = \frac{2}{\sqrt{3}}$

f)  $\cot \theta = \frac{1}{\sqrt{3}}$

3. One ship observes a second ship 6km away to the north-east. The first ship sights a flare due east. For the second ship, the flare is due south. How far is each ship from the flare?

4. In a baseball diamond, each baseline is 27.4m long. If the pitcher stands at the centre of the diamond, how far is she from each base?

5. A guy wire is fastened 6.2 m from the base of a hydro pole. Find the length of the guy wire and how far up the pole it is fastened for each of the following angles of elevation.

a)  $45^\circ$

b)  $30^\circ$

c)  $60^\circ$

6. Triangle ABC contains a right angle at C. Find the value of  $\sin A$  if:

a)  $\cos B = \frac{\sqrt{3}}{2}$

b)  $\tan B = 0.25$

c)  $\sec B = 2$

**Co-terminal angles and CAST**

7. Considering that  $\cos a = \frac{3}{7}$  where  $0 \leq a \leq 180$  and  $\sin b = \frac{\sqrt{7}}{4}$  where  $0 \leq b \leq 90$ , determine the value of each of the following trigonometric expressions.

a)  $\sin a$

b)  $\tan a$

c)  $\sec a$

d)  $\csc a$

e)  $\cot a$

f)  $\cos b$

g)  $\tan b$

h)  $\sec b$

i)  $\csc b$

j)  $\cot b$

8. If  $\cos x = \frac{12}{13}$  and  $0 \leq x \leq 90$ , determine the value of each of the following:

a)  $\sin x$

b)  $\sec x$

c)  $\tan x$

d)  $\csc x$

e)  $\cot x$

9. If  $\tan x = \sqrt{3}$  and  $180 \leq x \leq 360$ , determine the value of each of the following:

a)  $\cos x$

b)  $\cot x$

c)  $\csc x$

d)  $\sin x$

e)  $\sec x$

10. Given  $\sin \theta = 0.788$ , find the values of  $\theta$  over  $0 \leq x \leq 360$ .

11. Given  $\cos \theta = -0.2588$ , find the values of  $\theta$  over  $360 \leq x \leq 720$ .

## Radians and Arc Length

12. Express each of the following angle measures in radians. Express each answer in terms of  $\pi$ .

a)  $350^\circ$

b)  $5^\circ$

c)  $140^\circ$

d)  $25^\circ$

e)  $70^\circ$

f)  $-10^\circ$

13. Express each of the following angle measures in degrees.

a)  $\frac{\pi}{6} \text{ rad}$

b)  $\frac{5\pi}{12} \text{ rad}$

c)  $\frac{3\pi}{20} \text{ rad}$

d)  $7 \text{ rad}$

e)  $-\frac{\pi}{5} \text{ rad}$

f)  $-2 \text{ rad}$

14. In which quadrant will the arc representing each real number terminate?

a)  $-0.5$

b)  $\frac{\pi}{6}$

c)  $\frac{2\pi}{3}$

d)  $\frac{-7\pi}{5}$

e)  $2$

f)  $8$

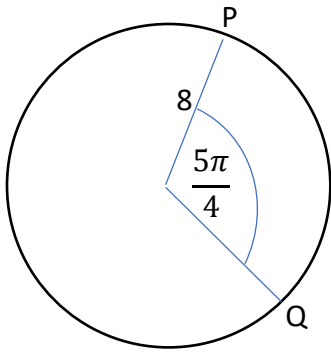
g)  $-10$

h)  $-17.8$

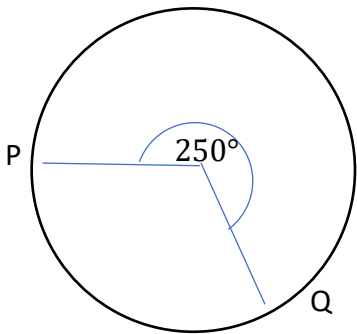
15. Given  $\cos \theta = \frac{-\sqrt{2}}{2}$ , find the values of  $\theta$  over  $0 \leq \theta \leq 2\pi$ .

16. Given  $\tan \theta = \sqrt{3}$ , find the values of  $\theta$  over  $\pi \leq \theta \leq 2\pi$ .

17. What is the arc length of PQ



18. What is the arc length of PQ



## The Unit Circle

17. Without using a calculator, give the coordinates of the trigonometric point corresponding to a central angle that measures:

a)  $0^\circ$

b)  $-90^\circ$

c)  $180^\circ$

d)  $240^\circ$

e)  $330^\circ$

f)  $\frac{\pi}{6}$

g)  $\frac{4\pi}{3}$

h)  $\frac{11\pi}{6}$

i)  $-\frac{\pi}{3}$

18. If R is a point on the unit circle, give the possible values for the missing coordinate.

a)  $R\left(\frac{\sqrt{2}}{2}, ?\right)$

b)  $R\left(?, \frac{-1}{2}\right)$



19. For each trigonometric point P, determine all the possible values for the unknown coordinate.

a)  $P\left(\frac{-5}{6}\right)$

b)  $R\left(?, \frac{3}{5}\right)$

20. Given  $\cos \theta = \frac{4}{5}$ , find all possible values of  $\theta$  over  $0^\circ \leq \theta$ .

21. Given  $\sin \theta = \frac{8}{9}$ , find all possible values of  $\theta$  over  $0 \text{ rad} \leq \theta$ .

### Trig Identities

22. Simplify each of the following expressions.

a)  $(1 - \cos^2 x)(\cot^2 x)$

b)  $\sec^2 x - \tan^2 x$

c)  $\csc^2 x - \cot^2 x$

d)  $\frac{1 + \tan^2 x}{\sec^2 x}$

e)  $\tan^2 x - \tan^2 x \sin^2 x$

f)  $\sec^2 x - \tan^2 x - \cos^2 x$

23. Prove:

$$\frac{\cos^2 x - \cos^4 x}{\sin^2 x - \sin^4 x} = 1$$

24. Prove:

$$(1 - \sin^2 x)(1 + \cot^2 x) = \cot^2 x$$

25. Prove:

$$\frac{\sin x + \cos x \cdot \cot x}{\cot x} = \sec x$$

26. Prove:

$$(\sec y - \tan y)^2 = \frac{1 - \sin y}{1 + \sin y}$$

27. Prove

$$\frac{\sec x}{\cos x} - \frac{\tan x}{\cot x} = 1$$