

Homework 03-08

Pythagorean Identity: $\sin^2 \theta + \cos^2 \theta = 1$

(Note: it is customary to write $\sin^2 \theta$ instead of $(\sin \theta)^2$ and $\cos^2 \theta$ instead of $(\cos \theta)^2$.)

Exercise Set A

In 1 -8, find the sine and cosine of the given angle.

1. 90°
 $\sin 90^\circ = 1$
 $\cos 90^\circ = 0$

2. 180°
 $\sin 180^\circ = 0$
 $\cos 180^\circ = -1$

3. $-\frac{\pi}{2}$
 $\sin -90^\circ = -1$
 $\cos -90^\circ = 0$

4. 2π
 $\sin 360^\circ = 0$
 $\cos 360^\circ = 1$

5. $-\pi$
 $\sin -180^\circ = 0$
 $\cos -180^\circ = -1$

6. $\frac{3\pi}{2}$
 $\sin 270^\circ = -1$
 $\cos 270^\circ = 0$

7. -90°
 same as #3

8. 0°
 $\sin 0^\circ = 0$
 $\cos 0^\circ = 1$

In 9-12, the coordinates of a point on the unit circle are given. If the terminal side of angle θ in standard position passes through the given point, find $\sin \theta$, $\cos \theta$ and $\tan \theta$.

9. $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

10. $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

11. $(-\frac{1}{3}, \frac{2\sqrt{2}}{3})$

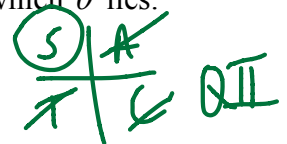
12. $(-\frac{\sqrt{2}}{3}, -\frac{\sqrt{7}}{3})$

$\cos \theta = -\frac{\sqrt{2}}{3}$
 $\sin \theta = -\frac{\sqrt{7}}{3}$
 $\tan \theta = \frac{\sqrt{7}}{\sqrt{2}}$

Given the values of $\sin \theta$, $\cos \theta$ and or $\tan \theta$, determine the quadrant in which θ lies.

13. $\sin \theta = -\frac{1}{4}, \cos \theta = -\frac{\sqrt{15}}{4}$

14. $\sin \theta = \frac{2}{3}, \tan \theta = -\frac{2\sqrt{5}}{5}$



15. $\sin \theta = \frac{3}{4}, \cos \theta = \frac{\sqrt{7}}{4}$

16. $\cos \theta = \frac{2\sqrt{5}}{5}, \tan \theta = -\frac{1}{2}$



Given the value of $\sin \theta$, $\cos \theta$ or $\tan \theta$ and the quadrant in which θ lies, find the value of the other two functions.

17. $\sin \theta = \frac{\sqrt{2}}{2}$, Quadrant I

18. $\sin \theta = -\frac{1}{2}$, Quadrant IV

19. $\cos \theta = \frac{1}{4}$, Quadrant IV

20. $\cos \theta = -\frac{4}{5}$, Quadrant II

21. $\sin \theta = -\frac{5}{13}$, Quadrant III

22. $\cos \theta = \frac{24}{25}$, Quadrant I

Evaluate.

23. $\sin \pi \cdot \cos \frac{\pi}{2}$

24. $\sin \pi + \cos \pi$
 $\sin 180^\circ + \cos 180^\circ = -1 + 0 = -1$

25. $\cos \frac{3\pi}{2} - \sin \frac{\pi}{2}$

26. $\sin^2 \frac{3\pi}{2} = (\sin 270^\circ)^2 = 1$

27. $\cos^2 \frac{\pi}{2} + \cos^2 \left(-\frac{\pi}{2}\right)$

28. $\sin \left(-\frac{\pi}{2}\right) \cdot \cos 2\pi$
 $\sin(-90^\circ) \cdot \cos 360^\circ = -1 \cdot 1 = -1$

29. If $\tan \theta$ is positive and $\cos \theta$ is negative, in which quadrant does θ terminate?

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30. If $\tan \theta < 0$ and $\sin \theta > 0$, in which quadrant does θ terminate?
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 Q II

31. If $\cos \theta < 0$ and $\tan \theta > 0$, in which quadrant does θ lie?

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32. If $\sin \theta < 0$ and $\cos \theta < 0$, in which quadrant does θ terminate?
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 Q III

33. If $\cos \theta > 0$ and $(\cos \theta)(\sin \theta) < 0$, in which quadrant does θ lie?

34. If $\tan A > 0$ and $(\tan A)(\sin A) > 0$, in what quadrant does $\angle A$ lie?
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