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. $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

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

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

12. $\left(-\frac{\sqrt{2}}{3}, -\frac{\sqrt{7}}{3}\right)$ $\cos\theta = -\frac{\sqrt{2}}{3}$ $\sin\theta = -\frac{\sqrt{7}}{3}$ $\tan\theta = \frac{\sqrt{7}}{\sqrt{2}}$

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

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

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

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. $\sin\pi + \cos\pi$

$\sin 180^0 + \cos 180^0 = -1 + 0 = -1$

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

26. $\sin^2\frac{3\pi}{2}$ $= (\sin 270^0)^2 = 1$

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

28. $\sin\left(-\frac{\pi}{2}\right) \cdot \cos 2\pi$

$\sin(-90^0) \cdot \cos 360^0 = -1 \cdot 1 = -1$

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

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

QII

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

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

QIII

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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