Section A: Converting Between Degrees and Radians

Convert each angle measurement. Express all radian answers in terms of π.

1. Convert $30°$ to radians.
   $\mathbf{30°} \times \frac{\pi}{\mathbf{180°}} = \frac{\pi}{\mathbf{6}}$ rad

2. Convert $135°$ to radians.
   $\mathbf{135°} \times \frac{\pi}{\mathbf{180°}} = \frac{\mathbf{3}\pi}{\mathbf{4}}$ rad

3. Convert $210°$ to radians.
   $\mathbf{210°} \times \frac{\pi}{\mathbf{180°}} = \frac{\mathbf{7}\pi}{\mathbf{6}}$ rad

4. Convert $270°$ to radians.
   $\mathbf{270°} \times \frac{\pi}{\mathbf{180°}} = \frac{\mathbf{3}\pi}{\mathbf{2}}$ rad

5. Convert $315°$ to radians.
   $\mathbf{315°} \times \frac{\pi}{\mathbf{180°}} = \frac{\mathbf{7}\pi}{\mathbf{4}}$ rad

6. Convert $-120°$ to radians.
   $\mathbf{-120°} \times \frac{\pi}{\mathbf{180°}} = -\frac{\mathbf{2}\pi}{\mathbf{3}}$ rad

7. Convert $\frac{\pi}{4}$ to degrees.
   $\frac{\pi}{\mathbf{4}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{45°}$

8. Convert $\frac{2\pi}{3}$ to degrees.
   $\frac{\mathbf{2}\pi}{\mathbf{3}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{120°}$

9. Convert $\frac{5\pi}{6}$ to degrees.
   $\frac{\mathbf{5}\pi}{\mathbf{6}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{150°}$

10. Convert $\frac{4\pi}{3}$ to degrees.
    $\frac{\mathbf{4}\pi}{\mathbf{3}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{240°}$

11. Convert $\frac{7\pi}{4}$ to degrees.
    $\frac{\mathbf{7}\pi}{\mathbf{4}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{315°}$

12. Convert $-\frac{5\pi}{6}$ to degrees.
    $-\frac{\mathbf{5}\pi}{\mathbf{6}} \times \frac{\mathbf{180°}}{\pi} = \mathbf{-150°}$

Section B: Identifying Quadrants and Terminal Points

Identify the quadrant/axis and the (x, y) coordinates for each angle.

13. $\theta = 120°$
    Quadrant: II
    Coordinates: $\left(-\frac{\mathbf{1}}{\mathbf{2}}, \frac{\sqrt{\mathbf{3}}}{\mathbf{2}}\right)$

14. $\theta = \frac{7\pi}{6}$
    Quadrant: III
    Coordinates: $\left(-\frac{\sqrt{\mathbf{3}}}{\mathbf{2}}, -\frac{\mathbf{1}}{\mathbf{2}}\right)$

15. $\theta = 315°$
    Quadrant: IV
    Coordinates: $\left(\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}, -\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}\right)$

16. $\theta = \frac{3\pi}{2}$
    Quadrant/Axis: Negative y-axis
    Coordinates: $(\mathbf{0}, \mathbf{-1})$

17. $\theta = \frac{5\pi}{3}$
    Quadrant: IV
    Coordinates: $\left(\frac{\mathbf{1}}{\mathbf{2}}, -\frac{\sqrt{\mathbf{3}}}{\mathbf{2}}\right)$

18. $\theta = 225°$
    Quadrant: III
    Coordinates: $\left(-\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}, -\frac{\sqrt{\mathbf{2}}}{\mathbf{2}}\right)$

Section C: Determining Signs of Trigonometric Functions

Indicate the sign (+ / −) and find the exact evaluated value.

19. $\sin(150°)$
Sign: **Positive (+)** **Value:** $\mathbf{\frac{1}{2}}$

20. $\cos\left(\frac{4\pi}{3}\right)$
Sign: **Negative (−)** **Value:** $\mathbf{-\frac{1}{2}}$

21. $\tan(315°)$
Sign: **Negative (−)** **Value:** $\mathbf{-1}$

22. $\sec(210°)$
Sign: **Negative (−)** **Value:** $\mathbf{-\frac{2\sqrt{3}}{3}}$

23. $\csc\left(\frac{3\pi}{4}\right)$
Sign: **Positive (+)** **Value:** $\mathbf{\sqrt{2}}$

24. $\cot(300°)$
Sign: **Negative (−)** **Value:** $\mathbf{-\frac{\sqrt{3}}{3}}$

25. $\cos\left(\frac{11\pi}{6}\right)$
Sign: **Positive (+)** **Value:** $\mathbf{\frac{\sqrt{3}}{2}}$

26. $\sin(240°)$
Sign: **Negative (−)** **Value:** $\mathbf{-\frac{\sqrt{3}}{2}}$

27. $\tan\left(\frac{2\pi}{3}\right)$
Sign: **Negative (−)** **Value:** $\mathbf{-\sqrt{3}}$

28. $\sec(135°)$
Sign: **Negative (−)** **Value:** $\mathbf{-\sqrt{2}}$

Section D: Evaluating Primary Trigonometric Functions (sin, cos, tan)

Find the exact value of each expression. Simplify radicals and rationalize denominators.

29. $\sin\left(\frac{\pi}{6}\right) = \mathbf{\frac{1}{2}}$

30. $\cos(120°) = \mathbf{-\frac{1}{2}}$

31. $\tan\left(\frac{3\pi}{4}\right) = \mathbf{-1}$

32. $\sin(240°) = \mathbf{-\frac{\sqrt{3}}{2}}$

33. $\cos\left(\frac{7\pi}{4}\right) = \mathbf{\frac{\sqrt{2}}{2}}$

34. $\tan(330°) = \mathbf{-\frac{\sqrt{3}}{3}}$

35. $\sin\left(\frac{3\pi}{2}\right) = \mathbf{-1}$

36. $\cos(180°) = \mathbf{-1}$

37. $\tan\left(\frac{7\pi}{6}\right) = \mathbf{\frac{\sqrt{3}}{3}}$

38. $\sin(300°) = \mathbf{-\frac{\sqrt{3}}{2}}$

39. $\cos\left(\frac{5\pi}{6}\right) = \mathbf{-\frac{\sqrt{3}}{2}}$

40. $\tan(225°) = \mathbf{1}$

Section E: Evaluating Reciprocal Trigonometric Functions (sec, csc, cot)

Find the exact value of each expression. Simplify radicals and rationalize denominators.

41. $\sec\left(\frac{\pi}{3}\right) = \mathbf{2}$

42. $\csc(135°) = \mathbf{\sqrt{2}}$

43. $\cot\left(\frac{7\pi}{6}\right) = \mathbf{\sqrt{3}}$

44. $\sec(240°) = \mathbf{-2}$

45. $\csc\left(\frac{5\pi}{3}\right) = \mathbf{-\frac{2\sqrt{3}}{3}}$

46. $\cot(315°) = \mathbf{-1}$

47. $\sec\left(\frac{3\pi}{4}\right) = \mathbf{-\sqrt{2}}$

48. $\csc(210°) = \mathbf{-2}$

49. $\cot\left(\frac{2\pi}{3}\right) = \mathbf{-\frac{\sqrt{3}}{3}}$

50. $\sec(0°) = \mathbf{1}$

51. $\csc\left(\frac{3\pi}{2}\right) = \mathbf{-1}$

52. $\cot(90°) = \mathbf{0}$

Section F: Mixed Review & Negative/Coterminal Angles

Evaluate the exact value of each trigonometric expression using reference angles or coterminal concepts.

53. $\sin(-45°) = \mathbf{-\frac{\sqrt{2}}{2}}$

54. $\cos\left(-\frac{2\pi}{3}\right) = \mathbf{-\frac{1}{2}}$

55. $\tan(405°) = \mathbf{1}$

56. $\sec\left(\frac{11\pi}{6}\right) = \mathbf{\frac{2\sqrt{3}}{3}}$

57. $\csc(-120°) = \mathbf{-\frac{2\sqrt{3}}{3}}$

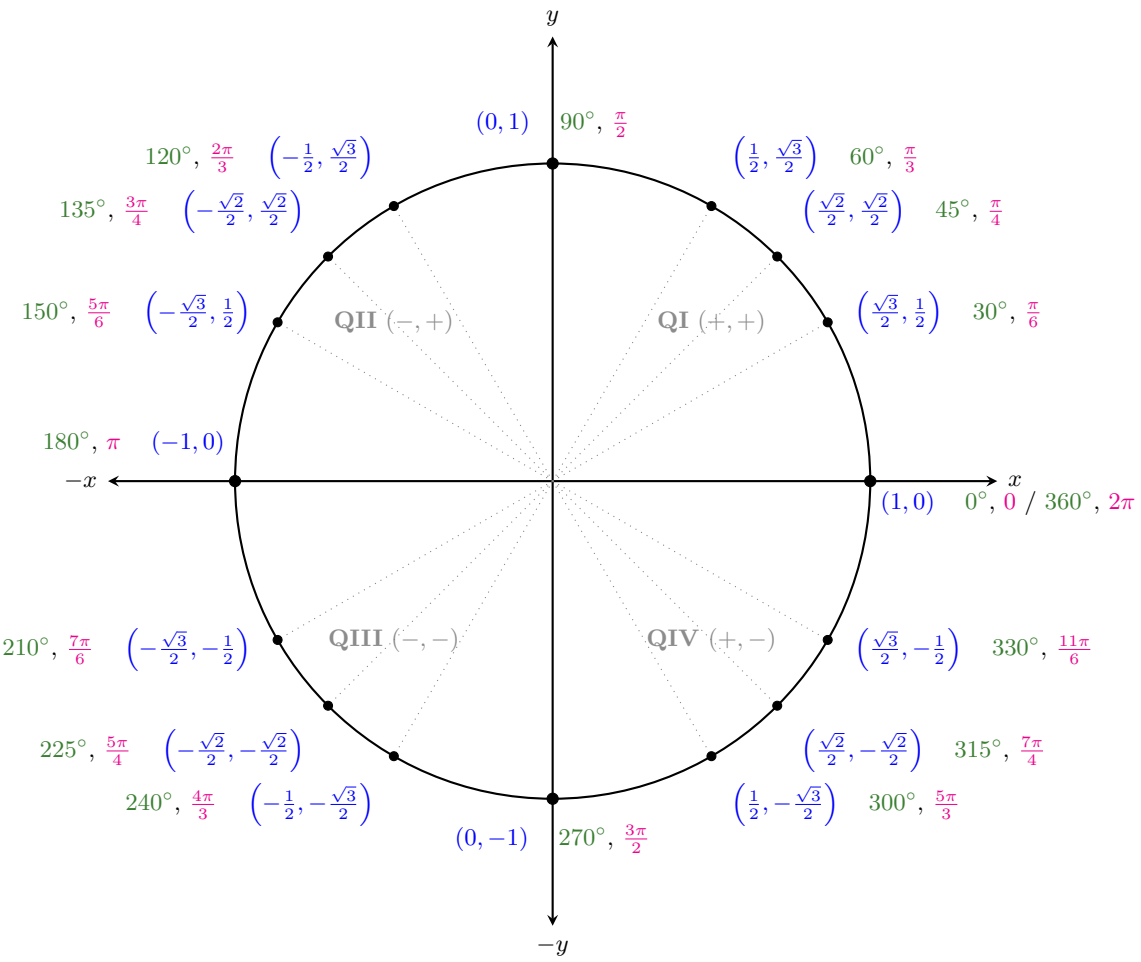
58. $\cot\left(-\frac{3\pi}{4}\right) = \mathbf{1}$

59. $\cos(480°) = -\mathbf{\frac{1}{2}}$

60. $\sin\left(\frac{9\pi}{4}\right) = \mathbf{\frac{\sqrt{2}}{2}}$

Teacher Reference: Complete Annotated Unit Circle

Annotations given as degrees radians coordinates



Trig Function Coordinate Key

$\cos\theta = x$

$\sin\theta = y$

$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{x}$

$\csc\theta = \frac{1}{\sin\theta} = \frac{1}{y}$

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{y}{x}$

$\cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta} = \frac{x}{y}$