

Find the angle measure θ , such that $0 \leq \theta < 2\pi$, that corresponds to the measure given. $\pm 2\pi$

1. $\frac{7\pi}{2} = \frac{3\pi}{2}$

2. $\frac{11\pi}{3} = \frac{5\pi}{3}$

3. $\frac{17\pi}{4} = \frac{\pi}{4}$

4. $\frac{29\pi}{6} = \frac{5\pi}{6}$

negative \rightarrow 5. $-\frac{\pi}{2} = \frac{3\pi}{2}$

6. $-\frac{4\pi}{3} = \frac{2\pi}{3}$

7. $-\frac{9\pi}{4} = \frac{7\pi}{4}$

8. $-\frac{17\pi}{6} = \frac{7\pi}{6}$

Find the values of the indicated trigonometric functions at the given angle. Answers must be exact. (I.e. radical form)

$\frac{0}{1} = 0$ $\frac{1}{0} = \emptyset$

9. $\sin \frac{3\pi}{2} = -1$

10. $\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$

11. $\sin \frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$

12. $\sin \frac{5\pi}{6} = \frac{1}{2}$

13. $\sin \frac{-\pi}{2} = -1$

14. $\sin \frac{15\pi}{3} = 0$

15. $\sin \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$

16. $\sin \frac{-13\pi}{6} = -\frac{1}{2}$
 $-\frac{13\pi}{6} + \frac{24\pi}{6} = \frac{11\pi}{6}$

17. $\cos \pi = -1$

18. $\cos \frac{5\pi}{3} = \frac{1}{2}$

19. $\cos \frac{7\pi}{4} = \frac{\sqrt{2}}{2}$

20. $\cos \frac{\pi}{6} = \frac{\sqrt{3}}{2}$

21. $\cos \frac{-\pi}{2} = 0$

22. $\cos \frac{-7\pi}{3} = \frac{1}{2}$
 $-\frac{7\pi}{3} + \frac{12\pi}{3} = \frac{5\pi}{3}$

23. $\cos \frac{13\pi}{4} = -\frac{\sqrt{2}}{2}$
 $\frac{13\pi}{4} - \frac{8\pi}{4} = \frac{5\pi}{4}$

24. $\cos \frac{21\pi}{6} = 0$
 $\frac{21\pi}{6} - \frac{12\pi}{6} = \frac{9\pi}{6} = \frac{3\pi}{2}$

25. $\tan \pi = 0$
 $\frac{0}{1}$

26. $\tan \frac{\pi}{3} = \sqrt{3}$
 $\frac{\sqrt{3}/2}{1/2} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

27. $\tan \frac{3\pi}{4} = -1$

28. $\tan \frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$
 $\frac{1/2}{-\sqrt{3}/2} = \frac{1}{2} \cdot \frac{2}{-\sqrt{3}} = -\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

29. $\tan \frac{-\pi}{2} = \emptyset$
 $-\frac{1}{0} = \text{undefined}$

30. $\tan \frac{8\pi}{3} = -\sqrt{3}$
 $\frac{8\pi}{3} - \frac{6\pi}{3} = \frac{2\pi}{3}$

31. $\tan \frac{-14\pi}{4} = \frac{1}{0} = \emptyset$
 $-\frac{14\pi}{4} + \frac{16\pi}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$

32. $\tan \frac{19\pi}{6} = -\frac{\sqrt{3}}{3}$
 $\frac{19\pi}{6} - \frac{12\pi}{6} = \frac{7\pi}{6}$

33. $\cot \frac{\pi}{2} = 0$
 $\frac{0}{1}$

34. $\cot \frac{2\pi}{3} = -\frac{\sqrt{3}}{3}$
 $\frac{-1/2}{\sqrt{3}/2} = -\frac{1}{2} \cdot \frac{2}{\sqrt{3}} = -\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

35. $\cot \frac{-3\pi}{4} = 1$

36. $\cot \frac{13\pi}{6} = \sqrt{3}$
 $\frac{13\pi}{6} - \frac{12\pi}{6} = \frac{\pi}{6}$

37. $\csc \frac{\pi}{2} = 1$
 $\sin = 1$

38. $\csc \frac{5\pi}{3} = -\frac{2\sqrt{3}}{3}$
 $\sin = -\frac{\sqrt{3}}{2}$ $\csc = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$

39. $\csc \frac{7\pi}{4} = -\sqrt{2}$
 $\sin = -\frac{\sqrt{2}}{2}$ $\csc = -\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\frac{2\sqrt{2}}{2} = -\sqrt{2}$

40. $\csc \frac{\pi}{6} = 2$
 $\sin = \frac{1}{2}$

41. $\sec \frac{-3\pi}{2} = \emptyset$
 $\cos = 0$ $\sec = \frac{1}{0}$

42. $\sec \frac{\pi}{3} = 2$
 $\cos = \frac{1}{2}$

43. $\sec \frac{11\pi}{4} = -\sqrt{2}$
 $\frac{11\pi}{4} - \frac{8\pi}{4} = \frac{3\pi}{4}$ $\cos = -\frac{\sqrt{2}}{2}$

44. $\sec \frac{-5\pi}{6} = -\frac{2\sqrt{3}}{3}$
 $\cos = -\frac{\sqrt{3}}{2}$ $\sec = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$

45. $\tan 7\pi = \frac{0}{1} = 0$
 $7\pi - 6\pi = \pi$

46. $\sec \frac{-9\pi}{2} = \frac{1}{0} = \emptyset$
 $-\frac{9\pi}{2} + \frac{12\pi}{2} = \frac{3\pi}{2}$
 $\cos = 0$

47. $\csc \frac{21\pi}{2} = 1$
 $\frac{21\pi}{2} - \frac{20\pi}{2} = \frac{\pi}{2}$
 $\sin = 1$

48. $\cot \frac{-19\pi}{2} = \frac{0}{1} = 0$
 $-\frac{19\pi}{2} + \frac{20\pi}{2} = \frac{\pi}{2}$