

Additional Practice with Coterminal & Reference Angles

Sketch each of the following angles in standard position.

1. 150°

2. -120°

3. $-\frac{7\pi}{4}$

4. $\frac{2\pi}{3}$

Determine the quadrant in which the terminal side of the angle lies.

5. 130° _____

6. -336° _____

7. 285° _____

8. -260° _____

9. $\frac{22\pi}{3}$ _____

10. $-\frac{\pi}{12}$ _____

Give 2 coterminal angles, one positive and one negative for each of the following.

11. 34° _____

12. -45° _____

13. -120° _____

14. 300° _____

15. $\frac{4\pi}{3}$ _____

16. $\frac{11\pi}{6}$ _____

17. $-\frac{7\pi}{6}$ _____

18. $\frac{\pi}{4}$ _____

Express each of the following in radian measure. Leave your answer exact and in terms of π .

19. 150° _____

20. 315° _____

21. -240° _____

22. 115° _____

23. 345° _____

24. -216° _____

Express each of the following in degree measure.

25. $\frac{5\pi}{9}$ _____

26. $-\frac{7\pi}{12}$ _____

27. $\frac{11\pi}{5}$ _____

Find the angle in radian measure **between 0 and 2π** which is coterminal with the following.

28. $\frac{11\pi}{4}$ _____

29. $\frac{23\pi}{4}$ _____

30. $\frac{31\pi}{6}$ _____

31. $\frac{40\pi}{3}$ _____

32. $-\frac{19\pi}{3}$ _____

Find the reference angle for each of the following.

33. 208° _____

34. $\frac{7\pi}{4}$ _____

35. $\frac{14\pi}{5}$ _____

36. -292° _____

37. $-\frac{5\pi}{3}$ _____

38. -445° _____

39. $\frac{13\pi}{9}$ _____

40. 517° _____

41. -165° _____

42. $\frac{17\pi}{6}$ _____

43. 322° _____

44. $-\frac{12\pi}{7}$ _____