

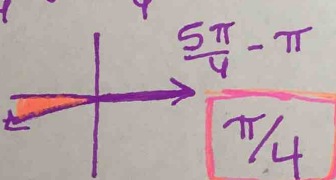
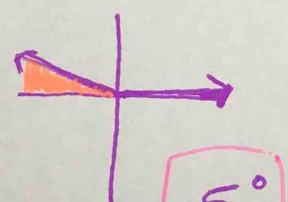
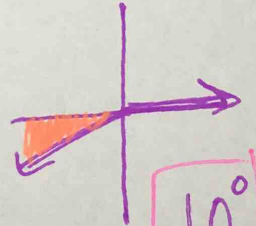
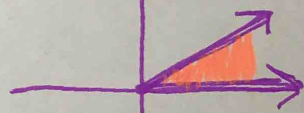
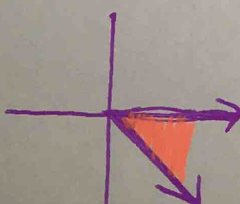
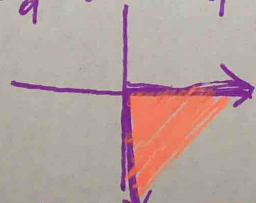
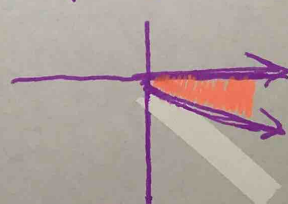
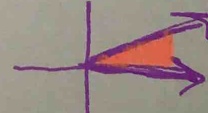
HM3 - Radians and Degree Measure

NAME key

For each angle, determine the quadrant in which the angles lies and find two coterminal angles (one positive and one negative).

1. $\frac{\pi}{5}$ Q I	2. $\frac{7\pi}{5}$ Q III	3. $-\frac{\pi}{12}$ Q IV	4. $-\frac{11\pi}{9}$ Q II
pos $\frac{11\pi}{5}$	neg $-\frac{9\pi}{5}$	pos $\frac{17\pi}{5}$	neg $-\frac{3\pi}{5}$
pos $\frac{23\pi}{12}$	neg $-\frac{25\pi}{12}$	pos $\frac{7\pi}{9}$	neg $-\frac{29\pi}{9}$
5. $\frac{\pi}{12}$ Q I	6. $\frac{2\pi}{3}$ Q II	7. $-\frac{9\pi}{4}$ Q IV	8. $-\frac{2\pi}{15}$ Q IV
pos $\frac{25\pi}{12}$	neg $-\frac{23\pi}{12}$	pos $\frac{8\pi}{3}$	neg $-\frac{4\pi}{3}$
pos $\frac{7\pi}{4}$	neg $-\frac{\pi}{4}$	pos $\frac{28\pi}{15}$	neg $-\frac{32\pi}{15}$
	neg $-\frac{17\pi}{4}$		

Sketch a picture and determine the Reference Angle for each (find coterminal angles if needed). Leave your answer in the form that was given (radians or degrees).

9. $-\frac{11\pi}{4}$ <i>find a coterminal angle</i> $-\frac{11\pi}{4} + 2 = -\frac{3\pi}{4}$ $-\frac{3\pi}{4} + 2 = \frac{5\pi}{4}$  $\frac{5\pi}{4} - \pi$ $\frac{\pi}{4}$	10. -185° $-185 + 360 = 175^\circ$  5°	11. 190°  10°	12. $\frac{7\pi}{3}$ $\frac{7\pi}{3} - 2\pi = \frac{\pi}{3}$  $\frac{\pi}{3}$
13. $\frac{11\pi}{6}$  $2\pi - \frac{11\pi}{6}$ $\frac{\pi}{6}$	14. $\frac{32\pi}{9}$ $\frac{32\pi}{9} - 2\pi = \frac{14\pi}{9}$  $2\pi - \frac{14\pi}{9}$ $\frac{4\pi}{9}$	15. -375° $-375 + 360 = -15$ $-15 + 360 = 345^\circ$  15°	16. $-\frac{23\pi}{6} + 2\pi = -\frac{11\pi}{6}$ $-\frac{11\pi}{6} + 2\pi = \frac{\pi}{6}$  $\frac{\pi}{6}$

Express the angle in radian measure as a multiple of π . Do not use a calculator.

17. 30°

$$\frac{\pi}{6}$$

18. 150°

$$\frac{5\pi}{6}$$

19. 315°

$$\frac{7\pi}{4}$$

20. 120°

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

21. -20°

$$-\frac{\pi}{9}$$

22. -240°

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

23. -270°

$$-\frac{3\pi}{2}$$

24. 144°

$$\frac{4\pi}{5}$$

25. 420°

$$\frac{7\pi}{3}$$

26. -390°

$$-\frac{13\pi}{6}$$

27. -215°

$$-\frac{43\pi}{36}$$

28. -495°

$$-\frac{11\pi}{4}$$

Express the angle in degree measure. Do not use a calculator.

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

$$270^\circ$$

30. $\frac{7\pi}{6}$

$$210^\circ$$

31. $-\frac{7\pi}{12}$

$$-105^\circ$$

32. $-\frac{\pi}{9}$

$$-20^\circ$$

33. $\frac{7\pi}{3}$

$$60^\circ$$

34. $-\frac{11\pi}{30}$

$$-66^\circ$$

35. $\frac{11\pi}{6}$

$$330^\circ$$

36. $\frac{34\pi}{15}$

$$408^\circ$$

37. $-\frac{\pi}{6}$

$$-30^\circ$$

38. $-\frac{31\pi}{18}$

$$-310^\circ$$

39. $\frac{5\pi}{9}$

$$100^\circ$$

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

$$240^\circ$$