

Memorize...

1. Definitions of six trig functions

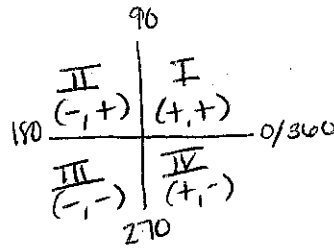
2. Reciprocal functions

3. "All Students Take Calculus"

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

5. $45^\circ - 45^\circ - 90^\circ$ and $30^\circ - 60^\circ - 90^\circ$ Triangles

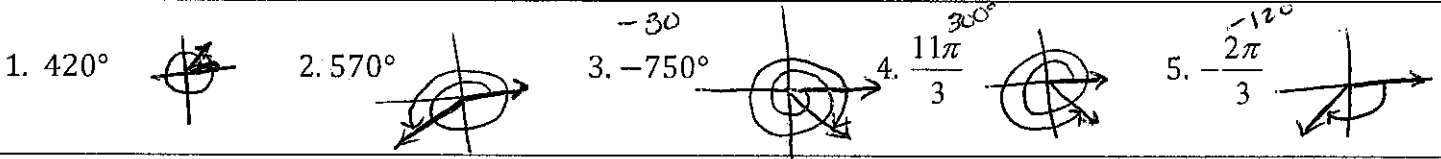
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Key

Study... standard position, negative angles, quadrants, coterminal angles, converting degrees and radians, trig ratios, reciprocal functions, reference angles

Sketch the following angles in standard position.



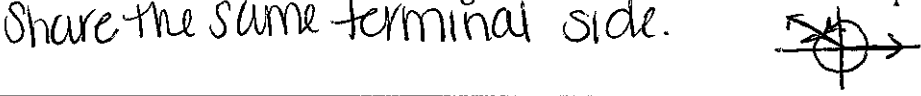
If each angle below is drawn in standard position, in which quadrant will the terminal side lie?

- 6. -952° II
- 7. $\frac{21\pi}{4}$ 945° III
- 8. 2.49 OMIT
- 9. $-\frac{4\pi}{3}$ II
 -240
- 10. 290° IV
- 11. $\frac{10\pi}{3}$ 600 III
- 12. $\frac{17\pi}{6}$ 510° II
- 13. $-\frac{11\pi}{4}$ III
 -495

Find one positive and one negative coterminal angle.

- 14. 578° $938, -142$
- 15. 245° $-115, 605$
- 16. $\frac{5\pi}{6}$ $\frac{17\pi}{6}, -\frac{7\pi}{6}$
- 17. $\frac{5\pi}{7}$ $-\frac{9\pi}{7}, \frac{19\pi}{7}$

18. What does it mean for two angles to be coterminal? Sketch a picture of two coterminal angles.



Convert from radians to degrees. Round to 3 decimal places.

- 19. $\frac{17\pi}{15}$ 204°
- 20. $\frac{9\pi}{11}$ 147.273
- 21. 4.325 omit

Convert from degrees to radians.

- 22. 100° (give answer in terms of pi)
 $\frac{100}{1} \cdot \frac{\pi}{180} = \frac{5\pi}{9}$
- 23. 115.34° (round to nearest hundredths)
 $115.34 \cdot \frac{\pi}{180} = 2.01$

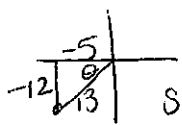
Determine the reference angle.

24. -125° $\overset{180-125}{55^\circ}$ 25. 620° $\overset{260-180}{80^\circ}$ 26. $\frac{7\pi}{9}$ $\overset{180-140}{40^\circ}$ 27. $\frac{11\pi}{3}$ $\overset{360-300}{60^\circ}$ 28. $-\frac{17\pi}{4}$ $\overset{-165}{45^\circ}$

Note: reference angles are always **positive** and less than 90 (in degrees) or $\frac{\pi}{2}$ (in radians)

Find the 6 trig functions of an angle in standard position whose terminal side passes through the given point.

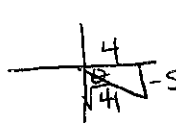
29. $(-5, -12)$ $(-5)^2 + (-12)^2 = C^2$



$169 = C^2$
 $13 = C$
 $\sin \theta = -\frac{12}{13}$ $\csc \theta = -\frac{13}{12}$
 $\cos \theta = -\frac{5}{13}$ $\sec \theta = -\frac{13}{5}$

$\tan \theta = -\frac{12}{5} = -\frac{12}{5}$ $\cot \theta = -\frac{5}{12}$

30. $(4, -5)$ $(4)^2 + (-5)^2 = 41$ $\sqrt{41} = C$



$\sin \theta = \frac{-5}{\sqrt{41}} = -\frac{5\sqrt{41}}{41}$ $\csc \theta = -\frac{\sqrt{41}}{5}$
 $\cos \theta = \frac{4}{\sqrt{41}} = \frac{4\sqrt{41}}{41}$ $\sec \theta = \frac{\sqrt{41}}{4}$

$\tan \theta = -\frac{5}{4}$ $\cot \theta = -\frac{4}{5}$

31. Find the remaining 5 trig function given that $\cos \theta = -\frac{7}{25}$ and θ is in quadrant II.

$25^2 - 7^2 = 576$ $\sqrt{576} = 24$ $\sin \theta = \frac{24}{25}$ $\csc \theta = \frac{25}{24}$ $\sec \theta = -\frac{25}{7}$ $\tan \theta = -\frac{24}{7}$ $\cot \theta = -\frac{7}{24}$

32. The point $(8, 15)$ is on the terminal side of an angle θ in standard position. Find $\sin \theta$.

$8^2 + 15^2 = 289$ $\sqrt{289} = 17$ $\sin \theta = \frac{15}{17}$

33. The point $(-7, 24)$ is on the terminal side of an angle θ in standard position. Find $\csc \theta$.

$(-7)^2 + (24)^2 = 625$ $\sqrt{625} = 25$ $\csc \theta = \frac{25}{24}$

34. The point $(6, -8)$ is on the terminal side of an angle θ in standard position. Find $\cos \theta$.

$6^2 + (-8)^2 = 100$ $\sqrt{100} = 10$ $\cos \theta = \frac{6}{10} = \frac{3}{5}$

35. Suppose $\cot \theta = \frac{5}{8}$, and the terminal side of the angle lies in quadrant 3. Find $\cos \theta$.

$25 + 4^2 = 49$ $\sqrt{49} = 7$ $\cos \theta = \frac{-5}{7} = -\frac{5}{7}$

36. Suppose $\cos \theta = -\frac{17}{8}$, and the terminal side of the angle lies in quadrant 2. Find $\tan \theta$.

$17^2 - (-8)^2 = 225$ $\sqrt{225} = 15$ $\tan \theta = \frac{15}{-8} = -\frac{15}{8}$

37. Suppose $\csc \theta = 2\sqrt{3}$, and the terminal side of the angle lies in quadrant 1. Find $\cot \theta$.

$2^2 - 1^2 = \sqrt{3}$ $\cot \theta = \frac{\sqrt{3}}{1} = \sqrt{3}$

Determine the value of each **without using a calculator**.

38. $\sin\left(\frac{11\pi}{6}\right)$

39. $\cos(2\pi)$

40. $\csc\left(-\frac{5\pi}{6}\right)$

41. $\tan\left(\frac{7\pi}{3}\right)$

42. $\cot(\pi)$

43. $\sin(225^\circ)$

44. $\tan(180^\circ)$

45. $\sin(90^\circ)$

46. $\cos(480^\circ)$

47. $\tan(315^\circ)$