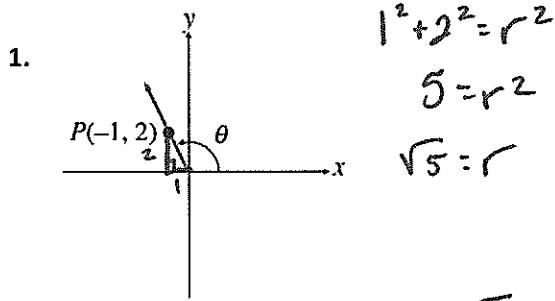


# Trigonometric Functions of Any Angle

Name Kely

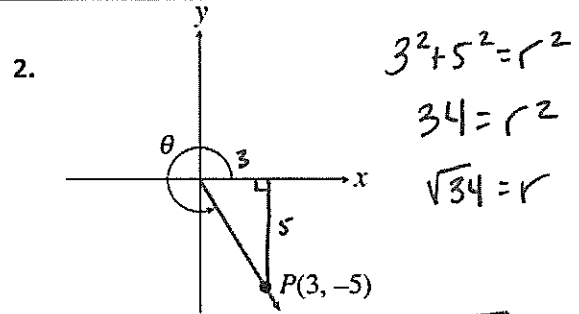
Evaluate the six trigonometric functions of the angle  $\theta$ . Leave your answers in simplified fraction form.



$$\sin\theta = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5} \quad \csc\theta = \frac{\sqrt{5}}{2}$$

$$\cos\theta = \frac{-1}{\sqrt{5}} = \frac{-\sqrt{5}}{5} \quad \sec\theta = \frac{-\sqrt{5}}{1}$$

$$\tan\theta = -2 \quad \cot\theta = \frac{-1}{2}$$

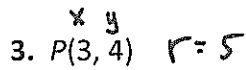


$$\sin\theta = \frac{-5}{\sqrt{34}} = \frac{-5\sqrt{34}}{34} \quad \csc\theta = \frac{-\sqrt{34}}{5}$$

$$\cos\theta = \frac{3}{\sqrt{34}} = \frac{3\sqrt{34}}{34} \quad \sec\theta = \frac{\sqrt{34}}{3}$$

$$\tan\theta = \frac{-5}{3} \quad \cot\theta = \frac{-3}{5}$$

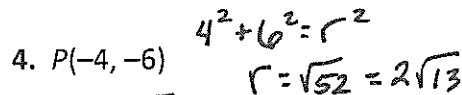
In exercises 3 – 8, point  $P$  is on the terminal side of angle  $\theta$ . Evaluate the indicated trigonometric functions for  $\theta$ . If the function is undefined, write "undefined". Leave your answers in simplified fraction form.



$$\sin\theta = \frac{4}{5}$$

$$\cos\theta = \frac{3}{5}$$

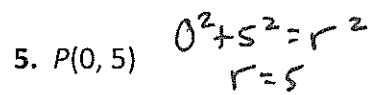
$$\tan\theta = \frac{4}{3}$$



$$\csc\theta = \frac{-\sqrt{52}}{6} = \frac{-\sqrt{13}}{3}$$

$$\sec\theta = \frac{-\sqrt{52}}{4} = \frac{-\sqrt{13}}{2}$$

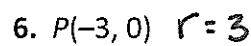
$$\cot\theta = \frac{-4}{-6} = \frac{2}{3}$$



$$\sin\theta = \frac{5}{5} = 1$$

$$\sec\theta = \frac{5}{0} \text{ undefined}$$

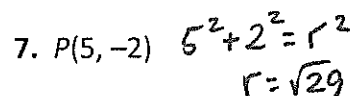
$$\tan\theta = \frac{5}{0} \text{ undefined}$$



$$\csc\theta = \frac{3}{0} \text{ undefined}$$

$$\cos\theta = \frac{-3}{3} = -1$$

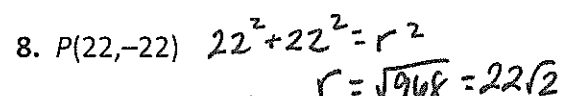
$$\cot\theta = \frac{-3}{0} \text{ undefined}$$



$$\sin\theta = \frac{-2\sqrt{29}}{29}$$

$$\cos\theta = \frac{5\sqrt{29}}{29}$$

$$\cot\theta = \frac{-5}{2}$$



$$\cos\theta = \frac{22}{\sqrt{968}} = \frac{\sqrt{2}}{2}$$

$$\sec\theta = \frac{\sqrt{968}}{22} = \sqrt{2}$$

$$\tan\theta = \frac{-22}{22} = -1$$

For problems 9 – 30, evaluate without using a calculator. Leave your answers in simplified fraction form.

9.  $\cos 120^\circ = -\frac{1}{2}$

10.  $\tan 300^\circ = -\sqrt{3}$

11.  $\sec \frac{\pi}{3} = -2$

12.  $\csc \frac{3\pi}{4} = \sqrt{2}$   
 $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

13.  $\sin \frac{13\pi}{6} = \frac{1}{2}$   
 $(\frac{\sqrt{3}}{2}, \frac{1}{2})$

14.  $\cos \frac{7\pi}{3} = \frac{1}{2}$   
 $(\frac{1}{2}, \frac{\sqrt{3}}{2})$

15.  $\tan -\frac{15\pi}{4} = 1$   
 $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

16.  $\cot \frac{13\pi}{4} = -1$   
 $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

17.  $\cos \frac{23\pi}{6} = \frac{\sqrt{3}}{2}$   
 $(\frac{\sqrt{3}}{2}, \frac{1}{2})$

18.  $\cos \frac{17\pi}{4} = \frac{\sqrt{2}}{2}$   
 $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

19.  $\sin \frac{11\pi}{3} = -\frac{\sqrt{3}}{2}$   
 $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

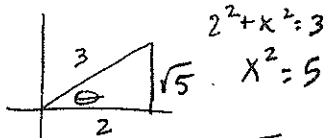
21.  $\cot \frac{19\pi}{6} = \sqrt{3}$   
 $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$   $\frac{-\sqrt{3} \cdot -\frac{1}{2}}{\frac{1}{2} \cdot -\frac{1}{2}}$

22.  $\sin(-450^\circ) = -1$   
 $(0, -1)$

23.  $\tan(-270^\circ) = \text{undef.}$   
 $(0, 1)$

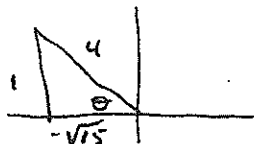
24.  $\cos -\frac{7\pi}{2} = 0$   
 $(0, 1)$

25. Find  $\sin \theta$  and  $\tan \theta$  if  $\cos \theta = \frac{2}{3}$  and  $\cot \theta > 0$ .



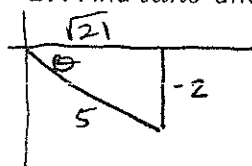
$2^2 + x^2 = 3^2$   
 $x^2 = 5$   
 $\sin \theta = \frac{\sqrt{5}}{3}$      $\tan \theta = \frac{\sqrt{5}}{2}$

26. Find  $\cos \theta$  and  $\cot \theta$  if  $\sin \theta = \frac{1}{4}$  and  $\tan \theta < 0$ .



$1^2 + x^2 = 4^2$   
 $x^2 = 15$   
 $\cos \theta = -\frac{\sqrt{15}}{4}$      $\cot \theta = -\sqrt{15}$

27. Find  $\tan \theta$  and  $\sec \theta$  if  $\sin \theta = -\frac{2}{5}$  and  $\cos \theta > 0$ .

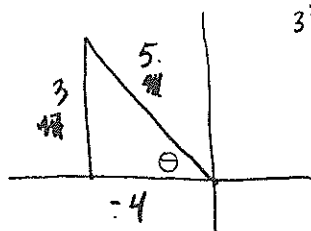


$(-2)^2 + x^2 = 5^2$   
 $x^2 = 21$

$\tan \theta = -\frac{2}{\sqrt{21}}$      $\sec \theta = \frac{5}{\sqrt{21}}$

or  $\tan \theta = -\frac{2\sqrt{21}}{21}$     or  $\sec \theta = \frac{5\sqrt{21}}{21}$

29. Find  $\sec \theta$  and  $\csc \theta$  if  $\cot \theta = -\frac{4}{3}$  and  $\cos \theta < 0$ .

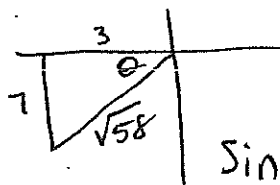


$3^2 + (-4)^2 = x^2$   
 $x^2 = 25$

$\sec \theta = -\frac{5}{4}$

$\csc \theta = \frac{5}{3}$

28. Find  $\sin \theta$  and  $\cos \theta$  if  $\cot \theta = \frac{3}{7}$  and  $\sec \theta < 0$ .

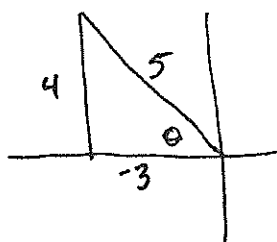


$3^2 + 7^2 = x^2$   
 $58 = x^2$

$\sin \theta = \frac{7}{\sqrt{58}}$  OR  $\frac{7\sqrt{58}}{58}$

$\cos \theta = -\frac{3}{\sqrt{58}}$  OR  $-\frac{3\sqrt{58}}{58}$

30. Find  $\csc \theta$  and  $\cot \theta$  if  $\tan \theta = -\frac{4}{3}$  and  $\sin \theta > 0$ .



$\csc \theta = \frac{5}{4}$

$\cot \theta = -\frac{3}{4}$