SM2H

Name:_____ Period:_____

SM2H 9.3 HW-Using the Unit Circle

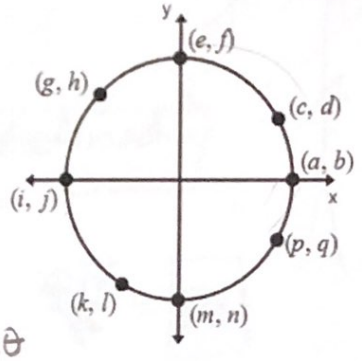
Refer to the diagram below. Give the letter or letters that could stand for the function value.

$(\cos\theta, \sin\theta)$

$\cot\theta = \frac{\cos\theta}{\sin\theta}$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$

$\sec\theta = \frac{1}{\cos\theta}$ $\csc\theta = \frac{1}{\sin\theta}$

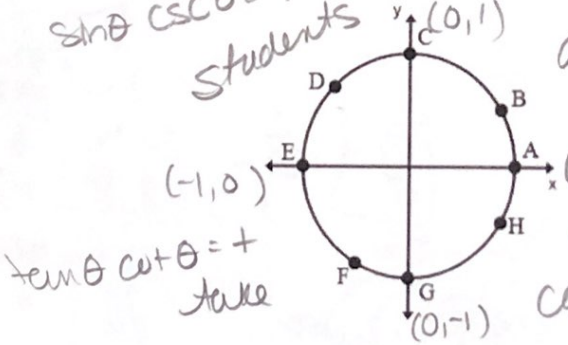


1. $\sin 180°$ j (i, j)
2. $\tan 0°$ b, a (a, b)
3. $\cos\frac{11\pi}{6}$ p (p, q)
4. $\cos 270°$ m (m, n)
5. $\sec 30°$ $\frac{1}{\cos\theta}$ $\frac{1}{c}$ (c, d)
6. $\sin 135°$ h (g, h)
7. $\cos 330°$ p (p, q)
8. $\csc\frac{\pi}{2}$ $\frac{1}{f}$ (e, f)
9. $\cot\frac{4\pi}{3}$ k, $\frac{k}{l}$ (k, l)
10. $\cos\frac{3\pi}{4}$ g (g, h)
11. $\tan\frac{4\pi}{3}$ l, $\frac{l}{k}$ (k, l)
12. $\sin 2\pi$ b (a, b)
13. $\sin\left(-\frac{11\pi}{6}\right)$ d (c, d)
14. $\tan -\frac{5\pi}{4}$ $\frac{h}{g}$ (g, h)
15. $\sec\frac{3\pi}{2}$ $\frac{1}{m}$ (m, n)
16. $\cos -\frac{2\pi}{3}$ k (k, l)

For the indicated point, tell if the value for $\sin\theta$ *or* $\cos\theta$ is positive, negative, neither (zero), or undefined.

$\sin\theta\ \csc\theta = +$ students

all +



$\tan\theta\ \cot\theta = +$ take

$\cos\theta\ \sec\theta = +$ calculus

17. $\cos G$ 0
18. $\csc B$ positive
19. $\sin G$ −1 negative
20. $\cot C$ 0
21. $\sin E$ 0
22. $\cos A$ positive
23. $\sin H$ negative
24. $\csc B$ positive
25. $\tan D$ negative
26. $\cot D$ negative
27. $\tan F$ positive
28. $\sec C$ $\frac{1}{0}$ = undefined

Find the exact value of each trigonometric function using the unit circle as a reference.

29) $\sin \frac{\pi}{2}$ = 1 (0,1)

30) $\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$

31) $\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$

32) $\sec \frac{2\pi}{3}$ $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ -2

33) $\tan\left(-\frac{\pi}{2}\right)$ $\frac{-1}{0}$ = undefined

34) $\cot \frac{\pi}{2}$ $\frac{0}{1} = 0$ (0,1)

35) $\sec(-45°)$ $\frac{\sqrt{2}}{2}$ $\frac{2}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{2\sqrt{2}}{2} = \sqrt{2}$

36) $\tan \frac{5\pi}{4}$ $\frac{-\sqrt{2}}{-\sqrt{2}} = 1$

37) $\cos 0°$ 1

38) $\sin \frac{7\pi}{6} = -\frac{1}{2}$

39) $\csc 45°$ $\frac{\sqrt{2}}{2}$ $\frac{2}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{2\sqrt{2}}{2} = \sqrt{2}$

40) $\cot -\frac{\pi}{3}$ $\cot\left(\frac{\pi}{3}\right)$ $\frac{1}{-\sqrt{3}} = \frac{-\sqrt{3}}{3}$

41) $\cos 315°$ $\frac{\sqrt{2}}{2}$

42) $\cos \frac{11\pi}{6} = \frac{\sqrt{3}}{2}$

43) $\cot 210°$ $\frac{-\sqrt{3}}{-1} = \sqrt{3}$

44) $\cot 90°$ $\frac{0}{1} = 0$ (0,1)

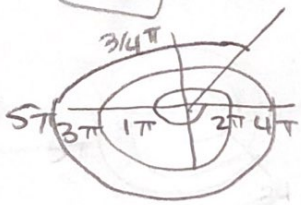
45) $\tan 225°$ $\frac{-\sqrt{2}}{-\sqrt{2}} = 1$

46) $\cot 240°$ $\frac{-1}{-\sqrt{3}} = \frac{\sqrt{3}}{3}$

47) $\tan \frac{17\pi}{6}$ $\frac{17}{6}\pi = 2\frac{5}{6}\pi$ $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ $\frac{1}{-\sqrt{3}} = -\frac{\sqrt{3}}{3}$

48) $\tan 720°$ $360 \cdot 2 = 720$ $\frac{0}{1} = 0$ $\tan 0°$ (1,0)

49) $\sin \frac{13\pi}{6}$ $\frac{13\pi}{6} = 2\frac{1}{6}\pi$ $\frac{1}{2}$



50) $\cot -\frac{23\pi}{4}$ $-5\frac{3}{4}\pi$ $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $\frac{\sqrt{2}}{\sqrt{2}} = 1$

51) $\sin -\frac{13\pi}{6}$ $\sin\left(-2\frac{1}{6}\pi\right)$ $\sin\left(\frac{11\pi}{6}\right)$ $-\frac{1}{2}$

52) $\sec \frac{8\pi}{3}$ -2 $\frac{8\pi}{3}$ $\sec 2\frac{2}{3}\pi$ $\sec\left(\frac{2}{3}\pi\right)$ $\frac{1}{2}$

[0°, 360°)

Find the exact measures of the angle (in degrees) using the unit circle. looking for angle

53. $\sin\theta = \frac{1}{2}$

30°, 150°

54. $\cos\theta = \frac{\sqrt{3}}{2}$

30°, 330°

55. $\tan\theta = \sqrt{3}$

60°, 240°

56. $\sin\theta = -\frac{\sqrt{2}}{2}$

225°, 315°

57. $\tan\theta = 0$

0°, 180°

58. $\tan\theta = undefined$

90°, 270°

Find the exact value of the expression using your unit circle. Do not use a calculator.

59. $\frac{\cos\frac{7\pi}{6}}{\sin\frac{7\pi}{6}}$ $-\frac{\sqrt{3}}{2}$ / $-\frac{1}{2}$ $\left(-\frac{\pi}{1}\right)$

$\sqrt{3}$

60. $\sin\frac{\pi}{4} + \cos\frac{\pi}{4}$

$\frac{1}{1}\frac{\sqrt{2}}{2} + \frac{1}{1}\frac{\sqrt{2}}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

61. $\csc\propto$, if $\sin\propto = \frac{3}{4}$

$\frac{4}{3}$

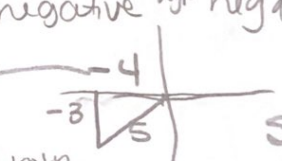
62. $\sec\propto$, if $\sin\propto = -\frac{3}{5}$ and $\cos\propto < 0$

opp negative hyp negative

$x^2 + 3^2 = 5^2$

$x^2 + 9 = 25$

$x^2 = 16$ $x = 4$



both negative in Q3

$\sec\propto = \frac{hyp}{adj}$

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

Find the quadrant that contains the terminal side of the angle θ.

63. $\csc\theta > 0$ and $\cot\theta > 0$

sin pos, tan pos

all students take Calculus

QI

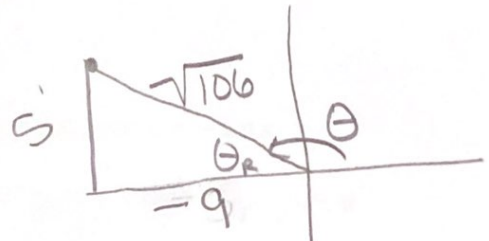
64. $\sin\theta < 0$ and $\tan\theta > 0$

negative positive

Q3

Find the exact values of $\sin\theta$, $\cos\theta$, $\tan\theta$, $\csc\theta$, $\sec\theta$, $\cot\theta$ where θ is an angle in standard position whose terminal side contains the given point. Reduce fractions if possible.

65. $(-9, 5)$



$9^2 + 5^2 = r^2$

$81 + 25 = r^2$

$106 = r^2$

$r = \sqrt{106}$

2 ^ 53

$\sin\theta = \frac{5}{\sqrt{106}}$ $\frac{5\sqrt{106}}{106}$ $\csc\theta = -\frac{\sqrt{106}}{5}$

$\cos\theta = \frac{-9}{\sqrt{106}} = \frac{-9\sqrt{106}}{106}$ $\sec\theta = \frac{\sqrt{106}}{-9}$

$\tan\theta = -\frac{5}{9}$ $\cot\theta = \frac{-9}{5}$