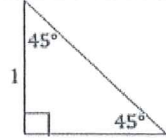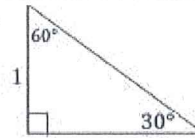## NO CALCULATOR ON THIS ENTIRE WORKSHEET

Use special right triangles to write the missing side lengths on each triangle.

Use the triangles above to state the **EXACT VALUE** of the trig functions **WITHOUT** using a calculator.

1. $\sin\frac{\pi}{6}$	2. $\cos\frac{\pi}{3}$	3. $\tan 60°$	4. $\sin 45°$	5. $\cos\frac{\pi}{4}$	6. $\tan\frac{\pi}{6}$	7. $\tan 45°$
8. $\cos 30°$	9. $\sin\frac{\pi}{3}$	10. $\cos 30°$	11. $\sin\frac{\pi}{3}$	12. $\tan 30°$	13. $\cos 45°$	14. $\tan\frac{\pi}{4}$

Label the **UNIT CIRCLE** to help state the **QUADRANTAL EXACT VALUES.**

15. $\cos 90°$	16. $\sin\frac{\pi}{2}$	17. $\cos \pi$	18. $\sin 2\pi$	
19. $\cos\frac{3\pi}{2}$	20. $\cos 0$	21. $\sin 180°$	22. $\sin(-90°)$	

23. $\sin 6\pi$	24. $\cos 9\pi$	25. $\tan\frac{\pi}{2}$	26. $\tan 2\pi$	27. $\tan 180°$	28. $\tan 90°$	29. $\tan 270°$
30. $\sin 180°$	31. $\cos(-270°)$	32. $\tan\frac{3\pi}{2}$	33. $\sin 2\pi$	34. $\tan\left(\frac{-\pi}{2}\right)$	35. $\tan\frac{\pi}{2}$	36. $\tan 7\pi$

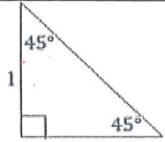Name each **QUADRANT** described. (I, II, III, IV)
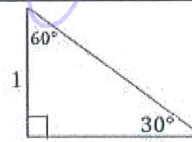
37. $\sin\theta > 0$ and $\cos\theta < 0$ *(positive)* *(negative)*	38. $\sin\theta < 0$ and $\cos\theta > 0$	39. $\sin\theta < 0$ and $\tan\theta > 0$	40. $\sec\theta > 0$ and $\csc\theta > 0$
			skip

State the **EXACT VALUE WITHOUT** using a calculator. Leave answers in simplest radical form or state that the value is undefined.

41. $\cos\frac{3\pi}{4}$	42. $\sin 210°$	43. $\cos\frac{11\pi}{6}$	44. $\tan 120°$	45. $\sin\frac{5\pi}{3}$	46. $\tan\frac{4\pi}{3}$
47. $\tan\frac{5\pi}{4}$	48. $\sin 225°$	49. $\tan 300°$	50. $\tan\frac{7\pi}{4}$	51. $\tan 150°$	52. $\cos\left(\frac{-5\pi}{6}\right)$
53. $\sin\frac{5\pi}{6}$	54. $\sin(-120°)$	55. $\cos 240°$	56. $\tan\frac{7\pi}{6}$	57. $\cos\frac{2\pi}{3}$	58. $\cos(-45°)$
59. $\sin(-240°)$	60. $\sin 135°$	61. $\tan 135°$	62. $\cos 150°$	63. $\sin 315°$	64. $\cos 300°$
65. $\tan 330°$	66. $\cos 225°$	67. $\sin\left(-\frac{\pi}{6}\right)$	68. $\sin\frac{7\pi}{2}$	69. $\cos\frac{5\pi}{2}$	70. $\tan 5\pi$
71. $\tan(-240°)$	72. $\tan(-120°)$	73. $\tan 135°$	74. $\tan 150°$	75. $\tan\frac{7\pi}{6}$	76. $\tan\frac{5\pi}{4}$
77. $\tan 315°$	78. $\sin 300°$	79. $\cos(-30°)$	80. $\cos\pi$	81. $\sin\pi$	82. $\sin\frac{\pi}{2}$

NO CALCULATOR ON THIS ENTIRE WORKSHEET

Use special right triangles to write the missing side lengths on each triangle.

Use the triangles above to state the **EXACT VALUE** of the trig functions **WITHOUT** using a calculator.

1. $\sin\frac{\pi}{6}$	2. $\cos\frac{\pi}{3}$	3. $\tan 60°$	4. $\sin 45°$	5. $\cos\frac{\pi}{4}$	6. $\tan\frac{\pi}{6}$	7. $\tan 45°$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}=\frac{\sqrt{3}}{2}\cdot\frac{2}{1}$ $\sqrt{3}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}\cdot\frac{2}{\sqrt{3}}$ $\frac{\sqrt{3}}{3}$	1

8. $\cos 30°$	9. $\sin\frac{\pi}{3}$	10. $\csc 30°$	11. $\sec\frac{\pi}{3}$	12. $\sec 30°$	13. $\csc 45°$	14. $\cot\frac{\pi}{4}$
$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\cos}{\frac{\sqrt{3}}{2}}$	$\frac{\sin}{\frac{1}{2}}$ $\sqrt{3}$	$\tan$ $\sqrt{3}$	$\cos$ $\frac{\sqrt{2}}{2}$	$\tan$ 1

Label the **UNIT CIRCLE** to help state the **QUADRANTAL EXACT VALUES**.

15. $\cos 90°$	16. $\sin\frac{\pi}{2}$	17. $\cos\pi$	18. $\sin 2\pi$	
0	1	-1	0	

19. $\cos\frac{3\pi}{2}$	20. $\cos 0$	21. $\sin 180°$	22. $\sin(-90°)$	
0	1	0	-1	

23. $\sin 6\pi$	24. $\cos 9\pi$	25. $\tan\frac{\pi}{2}$	26. $\tan 2\pi$	27. $\tan 180°$	28. $\sec 90°$	29. $\csc 270°$
0	-1	undef.	0	0	$\tan$ und.	$\tan$ und.

30. $\cot 180°$	31. $\csc(-270°)$	32. $\tan\frac{3\pi}{2}$	33. $\sec 2\pi$	34. $\sec\left(\frac{-\pi}{2}\right)$	35. $\cot\frac{\pi}{2}$	36. $\csc 7\pi$
$\sin$ 0	$\cos$ 0	unde.	$\sin$ 0	$\tan$ unde.	$\tan$ und.	$\tan$ 0

Name each **QUADRANT** described. (I, II, III, IV)

37. $\sin\theta > 0$ and $\cos\theta < 0$ *(positive)* *(negative)*	38. $\sin\theta < 0$ and $\cos\theta > 0$	39. $\sin\theta < 0$ and $\tan\theta > 0$	40. $\sec\theta > 0$ and $\csc\theta > 0$
			skip

State the **EXACT VALUE WITHOUT** using a calculator. Leave answers in simplest radical form or state that the value is undefined.

41. $\cos\frac{3\pi}{4}$	42. $\sin 210°$	43. $\cos\frac{11\pi}{6}$	44. $\tan 120°$	45. $\sin\frac{5\pi}{3}$	46. $\tan\frac{4\pi}{3}$
$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\sqrt{3}$	$-\frac{\sqrt{3}}{2}$	$\sqrt{3}$
47. $\tan\frac{5\pi}{4}$	48. $\sin 225°$	49. $\tan 300°$	50. $\tan\frac{7\pi}{4}$	51. $\tan 150°$	52. $\cos\left(\frac{-5\pi}{6}\right)$ or $7\pi/6$
1	$-\frac{\sqrt{2}}{2}$	$-\sqrt{3}$	-1	$\frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{-\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{2}$
53. $\sin\frac{5\pi}{6}$	54. $\sin(-120°)$ $(240°)$	55. $\cos 240°$	56. $\tan\frac{7\pi}{6}$	57. $\cos\frac{2\pi}{3}$	58. $\cos(-45°)$
$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{-1}{2}$	$\frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{3}$	$-\frac{1}{2}$	$\frac{\sqrt{2}}{2}$
59. $\sin(-240°)$ 120	60. $\sin 135°$	61. $\tan 135°$	62. $\cos 150°$	63. $\sin 315°$	64. $\cos 300°$
$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
65. $\tan 330°$	66. $\cos 225°$	67. $\sin\left(-\frac{\pi}{6}\right)$ $(11\pi/6)$	68. $\sin\frac{7\pi}{2}$	69. $\cos\frac{5\pi}{2}$ $\pi/2$	70. $\tan 5\pi$
$\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	$\frac{7\pi}{2} \Rightarrow \frac{3\pi}{2}$ -1	0	$\frac{0}{-1} = 0$

Now, try a few reciprocal functions. You may want to draw a labeled picture for these.

71. $\csc(-240°)$ 120	72. $\sec(-120°)$ (240)	73. $\cot 135°$	74. $\sec 150°$	75. $\cot\frac{7\pi}{6}$	76. $\csc\frac{5\pi}{4}$
$\tan$ $\frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}}$ $-\sqrt{3}$	$\tan$ $\sqrt{3}$	$\tan$ -1	$\tan$ $\frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{-\sqrt{3}}{3}$	$\tan$ $\frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{3}$	$\tan$ 1
77. $\sec 315°$	78. $\cot 300°$	79. $\csc(-30°)$	80. $\cot \pi$	81. $\sec \pi$	82. $\csc\frac{\pi}{2}$
$\tan$ -1	$\sin$ $-\frac{\sqrt{3}}{2}$	$\cos$ $\frac{\sqrt{3}}{2}$	$\cos$ -1	$\sin$ 0	$\sin$ 1