

Use the figure to find the exact value of each trig function.

1.  $\cos \frac{\theta}{2}$

2.  $\sin \frac{\theta}{2}$

3.  $\tan \frac{\theta}{2}$

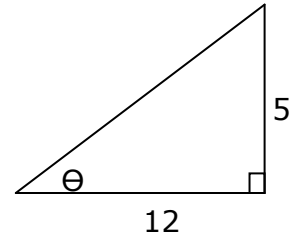
4.  $\sec \frac{\theta}{2}$

5.  $\csc \frac{\theta}{2}$

6.  $\cot \frac{\theta}{2}$

7.  $2\sin \frac{\theta}{2} \cos \frac{\theta}{2}$

8.  $2\cos \frac{\theta}{2} \tan \frac{\theta}{2}$



Use the half-angle identities to determine the exact values of each function.

9.  $\sin 112^\circ 30'$

10.  $\cos \frac{\pi}{12}$

11.  $\tan \frac{3\pi}{8}$

Find the exact values of each trig function using the half-angle identities.

12. Given ...  $\sin x = \frac{5}{13}$ ,  $\frac{\pi}{2} < x < \pi$  ... find  $\sin \frac{x}{2}$

13. Given ...  $\cos x = \frac{7}{25}$ ,  $0 < x < \frac{\pi}{2}$  ... find  $\cos \frac{x}{2}$

14. Given ...  $\tan x = -\frac{8}{5}$ ,  $\frac{3\pi}{2} < x < 2\pi$  ... find  $\tan \frac{x}{2}$

15. Given ...  $\cot x = 7$   $\pi < x < \frac{3\pi}{2}$  ... find  $\cos \frac{x}{2}$

**Answers**

1)  $\frac{5\sqrt{26}}{26}$    2)  $\frac{\sqrt{26}}{26}$    3)  $\frac{1}{5}$    4)  $\frac{\sqrt{26}}{5}$    5)  $\sqrt{26}$    6) 5   7)  $\frac{5}{13}$    8)  $\frac{\sqrt{26}}{13}$

9)  $\frac{\sqrt{2+\sqrt{2}}}{2}$    10)  $\frac{\sqrt{2+\sqrt{3}}}{2}$    11)  $\sqrt{2}+1$    12)  $\frac{5\sqrt{26}}{26}$    13)  $\frac{4}{5}$    14)  $\frac{5-\sqrt{89}}{8}$    15)  $-\frac{\sqrt{50-7\sqrt{50}}}{10}$