

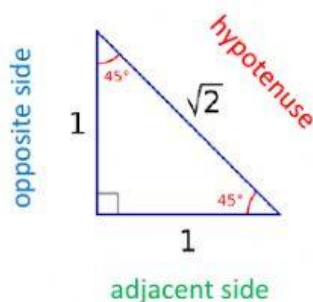
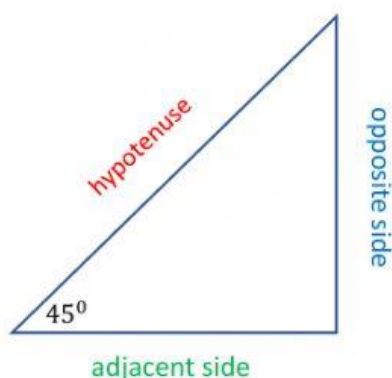


Assumption College Ubonratchathani
English for Math 3

Name:..... Class:..... No.

Trigonometric Ratios of 45°

($\sin 45^\circ$, $\cos 45^\circ$, $\tan 45^\circ$, $\operatorname{cosec} 45^\circ$, $\sec 45^\circ$, $\cot 45^\circ$)



For $\theta = 45^\circ$, the ratio of **Opposite Side** : **Adjacent Side** : **Hypotenuse** = **1** : **1** : **$\sqrt{2}$**

$$\sin 45^\circ = \frac{\text{opp}}{\text{hyp}} = \frac{1}{\sqrt{2}} \text{ or } \frac{\sqrt{2}}{2}$$

$$\operatorname{cosec} 45^\circ = \frac{\text{hyp}}{\text{opp}} = \frac{\sqrt{2}}{1} = \sqrt{2}$$

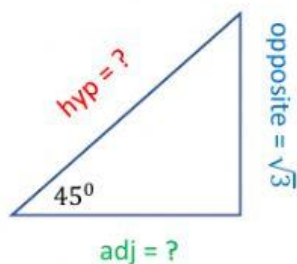
$$\cos 45^\circ = \frac{\text{adj}}{\text{hyp}} = \frac{1}{\sqrt{2}} \text{ or } \frac{\sqrt{2}}{2}$$

$$\sec 45^\circ = \frac{\text{hyp}}{\text{adj}} = \frac{\sqrt{2}}{1} = \sqrt{2}$$

$$\tan 45^\circ = \frac{\text{opp}}{\text{adj}} = \frac{1}{1} = 1$$

$$\cot 45^\circ = \frac{\text{adj}}{\text{opp}} = \frac{1}{1} = 1$$

Example: Find all the trigonometric ratios of the triangle below with $\theta = 45^\circ$.



Solution:

Step 1: Find the hypotenuse and adjacent side.

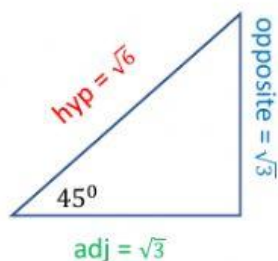
The ratio of sides of triangle for 60° are:

Opp : Adj : Hyp =

$$\begin{array}{ccc} 1 & : & 1 & : & \sqrt{2} \\ \downarrow \times \sqrt{3} & & \downarrow \times \sqrt{3} & & \downarrow \times \sqrt{3} \\ \sqrt{3} & : & \sqrt{3} & : & \sqrt{6} \end{array}$$

Hypotenuse = $\sqrt{6}$

Adjacent Side = $1\sqrt{3} = \sqrt{3}$



Step 2: Find the 6 trigonometric ratios.

$$\sin 60^\circ = \frac{\text{opp}}{\text{hyp}} = \frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$$

$$\operatorname{cosec} 60^\circ = \frac{\text{hyp}}{\text{opp}} = \frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1} \text{ or } \sqrt{2}$$

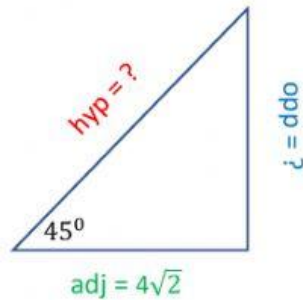
$$\cos 60^\circ = \frac{\text{adj}}{\text{hyp}} = \frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$$

$$\sec 60^\circ = \frac{\text{hyp}}{\text{adj}} = \frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1} \text{ or } \sqrt{2}$$

$$\tan 60^\circ = \frac{\text{opp}}{\text{adj}} = \frac{\sqrt{3}}{\sqrt{3}} = 1$$

$$\cot 60^\circ = \frac{\text{adj}}{\text{opp}} = \frac{\sqrt{3}}{\sqrt{3}} = 1$$

- A. For numbers 1-8, refer to the triangle below
The adjacent side of the triangle below is $4\sqrt{2}$.



1. Find the hypotenuse.

- a. $4\sqrt{2}$ b. 8 c. $8\sqrt{2}$

2. Find the opposite side.

- a. $4\sqrt{2}$ b. $8\sqrt{2}$ c. 8

3. Find $\sin 45^\circ$.

- a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1 b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$ c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

4. Find $\cos 45^\circ$.

- a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1 b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$ c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

5. Find $\tan 45^\circ$.

- a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1 b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$ c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

6. Find $\operatorname{cosec} 45^\circ$.

- a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1 b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$ c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

7. Find $\sec 45^\circ$.

- a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1 b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$ c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

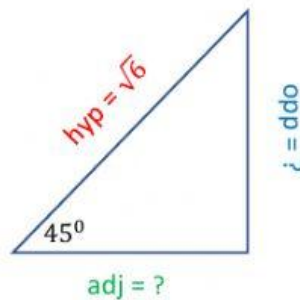
8. Find $\cot 45^\circ$.

a. $\frac{4\sqrt{2}}{4\sqrt{2}} = \frac{1}{1}$ or 1

b. $\frac{8}{4\sqrt{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$

c. $\frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$

B. For numbers 9-16, refer to the triangle below
The **hypotenuse** of the triangle below is $\sqrt{6}$.



9. Find the adjacent side.

a. $\sqrt{3}$

b. 1

c. $\sqrt{2}$

10. Find the opposite side.

a. 1

b. $\sqrt{2}$

c. $\sqrt{3}$

11. Find $\sin 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

12. Find $\cos 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

13. Find $\tan 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

14. Find $\operatorname{cosec} 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

15. Find $\sec 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

16. Find $\cot 45^\circ$.

a. $\frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{1}$ or 1

b. $\frac{\sqrt{3}}{\sqrt{6}} = \frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{6}}{\sqrt{3}} = \frac{\sqrt{2}}{1}$ or $\sqrt{2}$

Set tough goals and do not stop until you achieve them.

(ตั้งเป้าหมายที่ยากและอย่าหยุดจนกว่าคุณจะบรรลุเป้าหมาย)



-- Anonymous