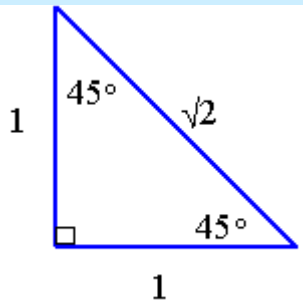
Values of the Trigonometric Functions

Examples - Finding Exact Values of Trigonometric Ratios

1. Find the exact value of $\sin\theta$ if the terminal side of θ passes through (7, 4).

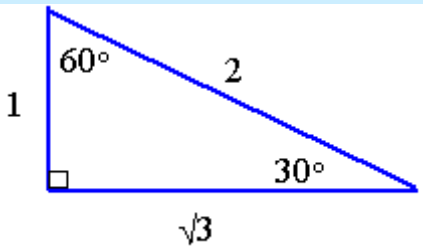
2. Find the exact values of all 6 trigonometric ratios of θ if the terminal side of θ passes through (2, 10).

Ratios for 45°:



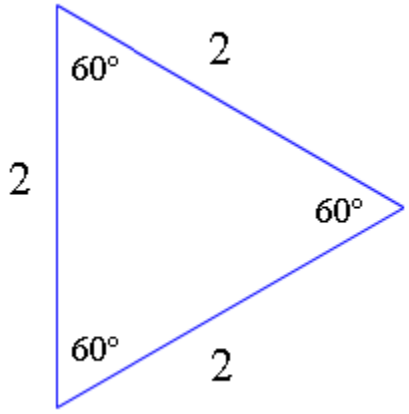
$$\sin 45° = \frac{\text{opp}}{\text{hyp}} = \frac{1}{\sqrt{2}} \quad \cos 45° = \frac{\text{adj}}{\text{hyp}} = \frac{1}{\sqrt{2}} \quad \tan 45° = \frac{\text{opp}}{\text{adj}} = \frac{1}{1} = 1$$

30° - 60° Triangle:

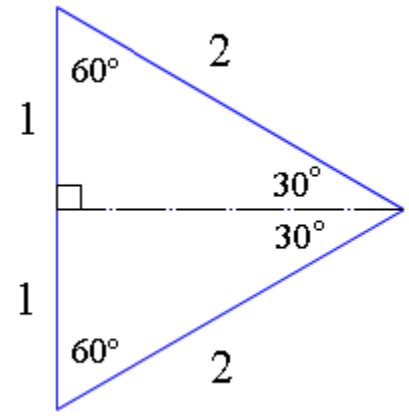


$$\sin 30° = \frac{\text{opp}}{\text{hyp}} = \frac{1}{2} \quad \cos 30° = \frac{\text{adj}}{\text{hyp}} = \frac{\sqrt{3}}{2} \quad \tan 30° = \frac{\text{opp}}{\text{adj}} = \frac{1}{\sqrt{3}}$$

Take an equilateral triangle, sides 2 units:



Now, cut it in half horizontally:



Take the top half only. The unknown side is the √3 and the 30° and 60° angles are as indicated: