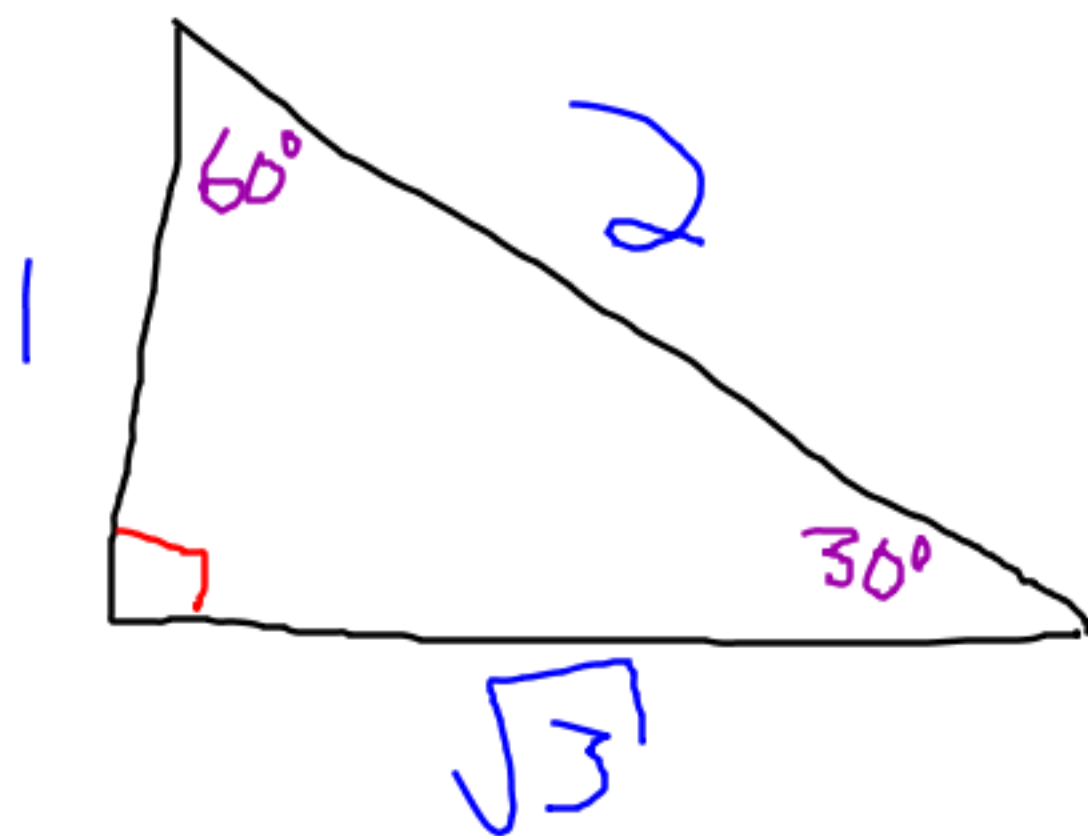


5.2 Special Triangles

① 30-60-90



1, sqrt(3), 2

$$\sin 30 = \frac{1}{2}$$

$$\cos 30 = \frac{\sqrt{3}}{2}$$

$$\tan 30 = \frac{1 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{3}}{3}$$

↑ ↗

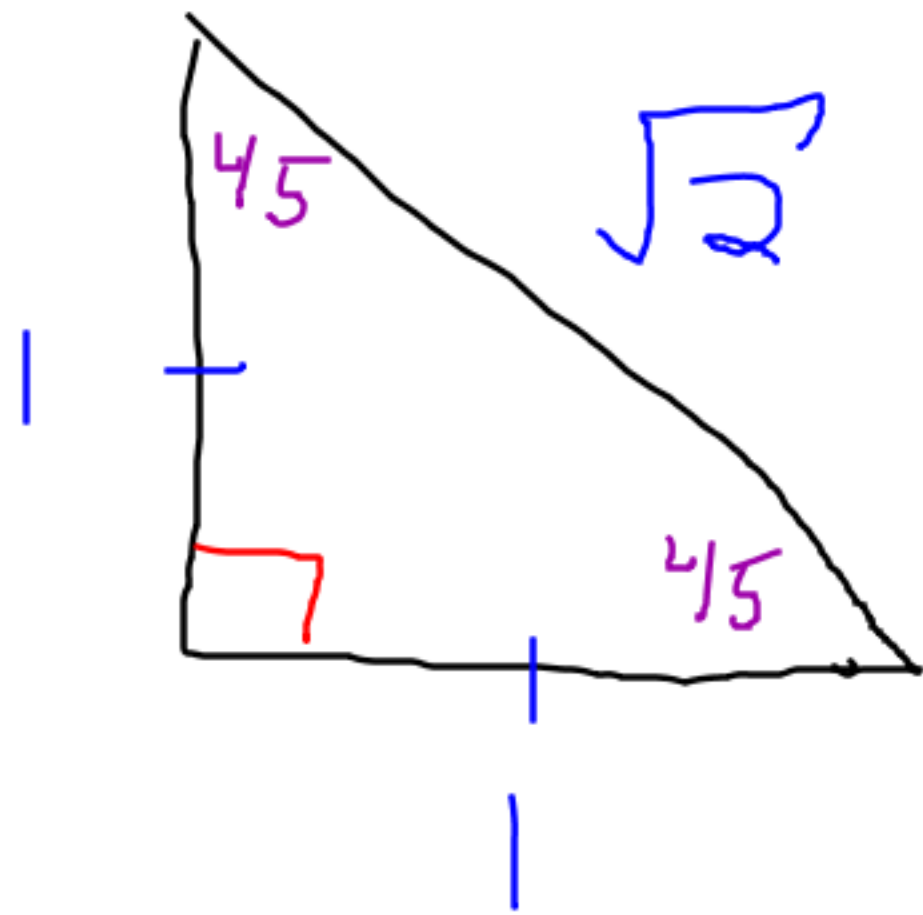
$$\sin 60 = \frac{\sqrt{3}}{2}$$

$$\cos 60 = \frac{1}{2}$$

$$\tan 60 = \frac{\sqrt{3}}{1} = \sqrt{3}$$

5.2 Special Triangles

② 45-45-90



$$\sin 45 = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos 45 = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\tan 45 = \frac{1}{1} = 1$$

Solve without a calculator:

a) $\sin 30^\circ \times \tan 60^\circ - \cos 30^\circ$

$$\frac{1}{2} \times \sqrt{3} - \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} = 0$$

Verify with $\theta = 30^\circ$

b) $\sin^2 \theta + \cos^2 \theta = 1$

$$(\sin 30^\circ)^2 + (\cos 30^\circ)^2$$

$$\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$$

Note: $\sin^2 \theta = (\sin \theta)^2$