

Name: \_\_\_\_\_

Date: \_\_\_\_\_

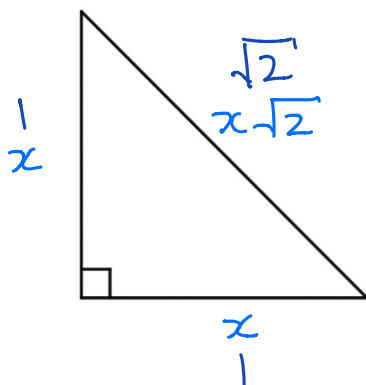
**Learning Goal 2.2**

Using trigonometric ratios and solving simple trigonometric equations.

**Special Angle Triangles**

$$45^\circ - 45^\circ - 90^\circ \quad \leftarrow \text{angles}$$

$$1 - 1 - \sqrt{2} \quad \leftarrow \text{sides}$$



$$r^2 = x^2 + x^2$$

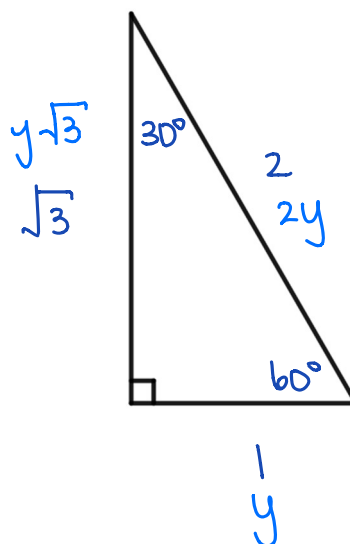
$$r^2 = 2x^2$$

$$r = \sqrt{2x^2}$$

$$= x\sqrt{2}$$

$$30^\circ - 60^\circ - 90^\circ \quad \leftarrow \text{angles}$$

$$1 - 2 - \sqrt{3} \quad \leftarrow \text{sides}$$

**Example** Determine the exact value of  $\cos 135^\circ$ 

$$\theta_R = 180^\circ - 35^\circ$$

$$= 45^\circ$$

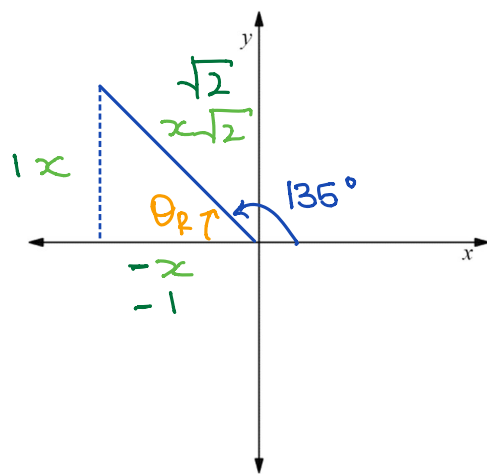
$$\cos 135 = \frac{x}{r} = \frac{-x}{x\sqrt{2}}$$

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

$$= \frac{-\sqrt{2}}{2}$$

$$\cos 135 = \frac{x}{r} = \frac{-1}{\sqrt{2}}$$

$$= \frac{-\sqrt{2}}{2}$$



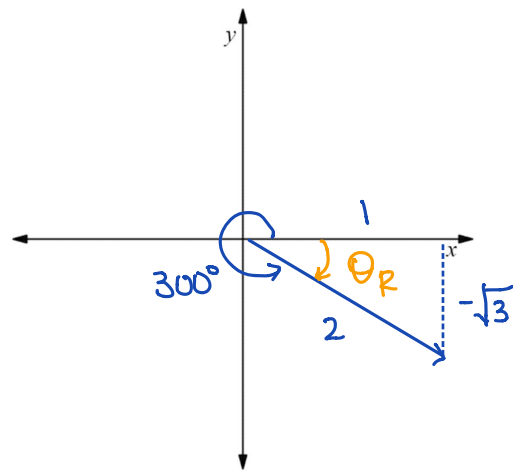
**Example** Determine the exact values of the sine, cosine and tangent ratios for  $300^\circ$

$$\theta_R = 360 - 300 \\ = 60^\circ$$

$$\sin \theta = \frac{y}{r} = -\frac{\sqrt{3}}{2}$$

$$\cos \theta = \frac{x}{r} = \frac{1}{2}$$

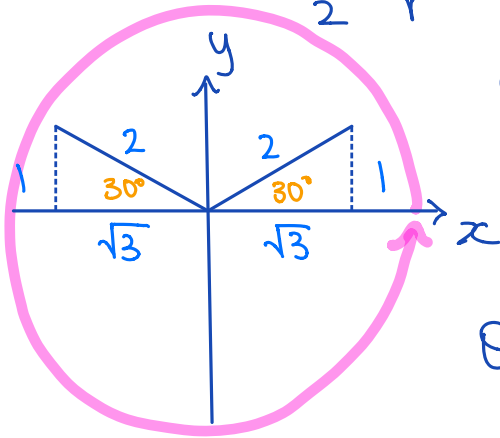
$$\tan \theta = \frac{y}{x} = -\frac{\sqrt{3}}{1} = -\sqrt{3}$$



**Example** Solve for  $\theta$ .

a.  $\sin \theta = 0.5, \quad 0^\circ \leq \theta < 360^\circ$

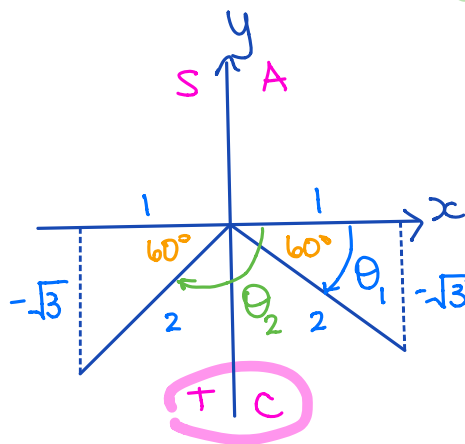
$$\sin \theta = \frac{1}{2} = \frac{y}{r}$$



$$\theta_1 = 30^\circ$$

$$\theta_2 = 180^\circ - 30^\circ \\ = 150^\circ$$

b.  $\sin \theta = -\frac{\sqrt{3}}{2}, \quad -180^\circ \leq \theta < 180^\circ$



$$\theta_1 = -\theta_R = -60^\circ$$

$$\theta_2 = -180 + 60^\circ \\ = -120^\circ$$