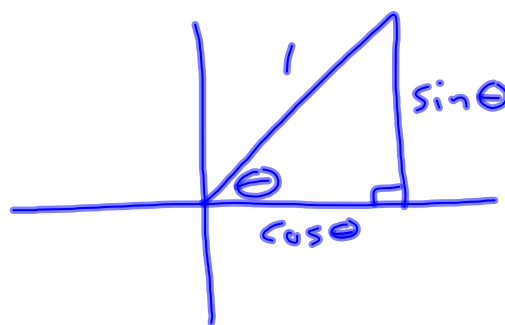


## 4-3 Right Triangle Trigonometry (continued)

Trigonometric identities

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

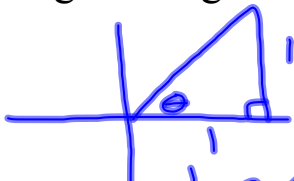
$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$




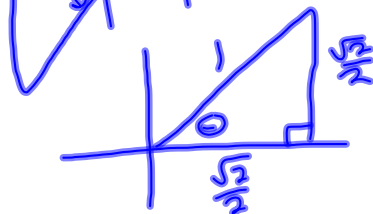
$$\begin{aligned} & \sin^2 \theta + \cos^2 \theta = 1 \\ & \frac{\sin^2 \theta}{\cos^2 \theta} + \frac{\cos^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta} \\ & 1 + \tan^2 \theta = \sec^2 \theta \end{aligned} \quad \begin{aligned} & \tan^2 \theta + 1 = \sec^2 \theta \\ & \leftarrow \end{aligned}$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

Ex 1 Use special right triangles to solve for  $\theta$

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

 $\theta = 45^\circ$   
 $= 225^\circ$

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

 $\theta = 60^\circ$   
 $= 240^\circ$

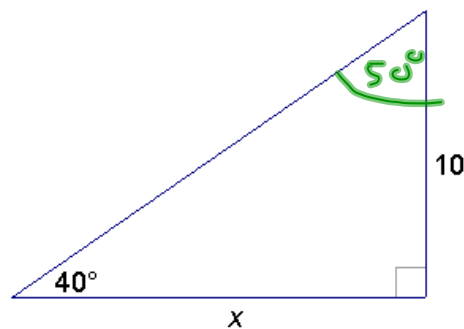
$\cos \theta = \frac{\sqrt{2}}{2}$ 

 $\theta = 45^\circ$   
 $= 315^\circ$

$\cot \theta = \frac{\sqrt{3}}{3}$ 
 $\tan \theta = \frac{3 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$ 
 $\theta = 60^\circ$   
 $240^\circ$

Ex 2 Solve for  $x$

$$\frac{\tan 40^\circ}{1} = \frac{10}{x}$$

$$x \approx 11.9$$

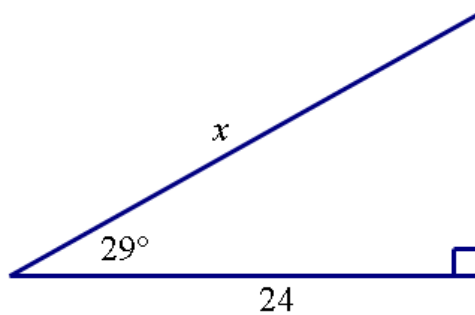


$$\tan 50^\circ = \frac{x}{10}$$

Ex 3 Solve for  $x$ 

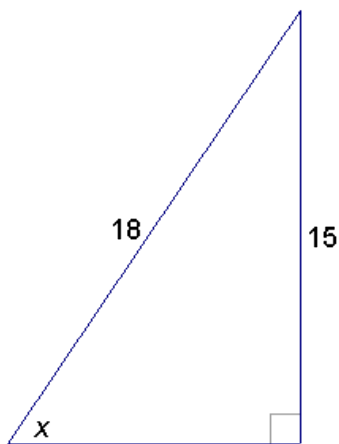
$$\cos 29^\circ = \frac{24}{x}$$

$$x \approx 27.4$$

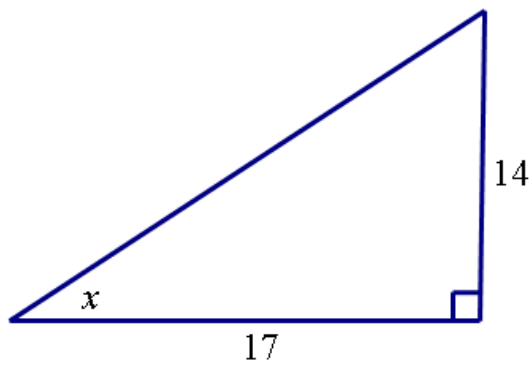
Ex 4 Solve for  $x$ 

$$\cancel{\sin} \sin x = \sin^{-1} \frac{15}{18}$$

$$x \approx 56.4^\circ$$



Ex 5 Solve for  $x$



$$\cancel{\tan^{-1}} \quad \tan^{-1} \frac{14}{17}$$
$$\cancel{\tan} x = \frac{14}{17}$$

$$x \approx 39.5^\circ$$

Ex 6 Show that the following identity is true.

$$\cot \theta \sin \theta = \cos \theta$$

$$\frac{\cos \theta}{\cancel{\sin \theta}} \cdot \frac{\cancel{\sin \theta}}{1} = \cos \theta$$

$$\cos \theta = \cos \theta$$

Homework  
p.285  
#63-75, 49-53  
odds