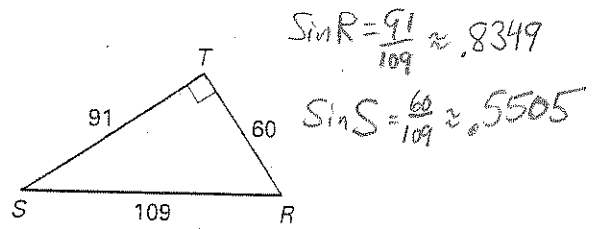
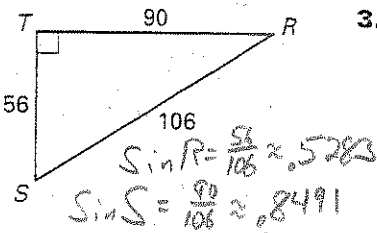
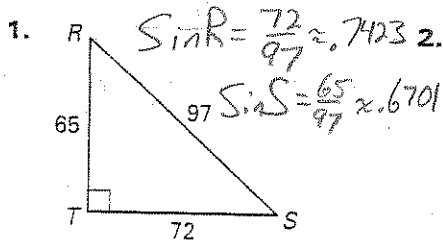
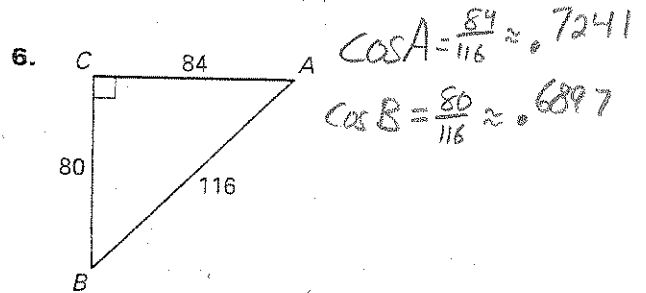
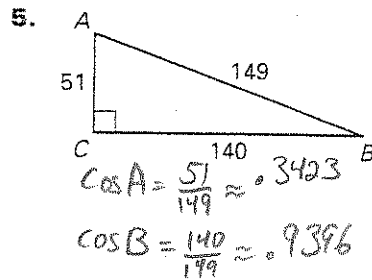
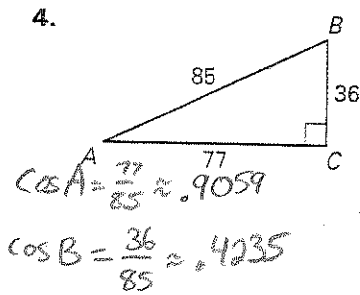


# Adv. Geometry 7.6 - Sine & Cosine Key

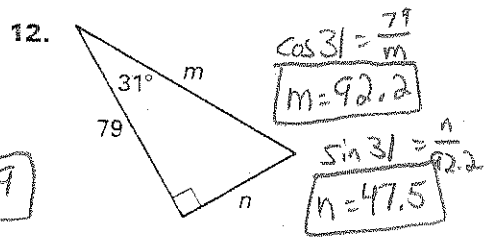
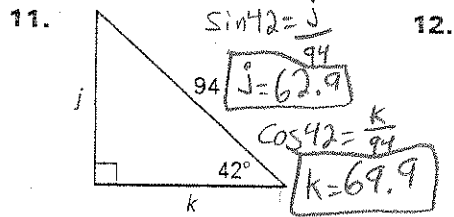
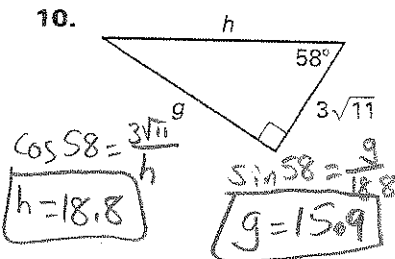
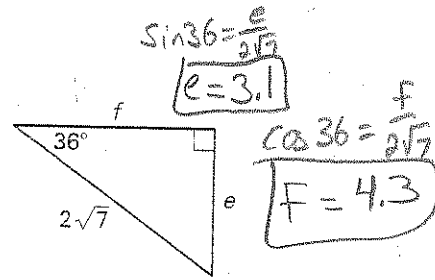
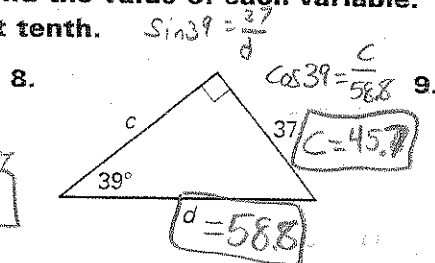
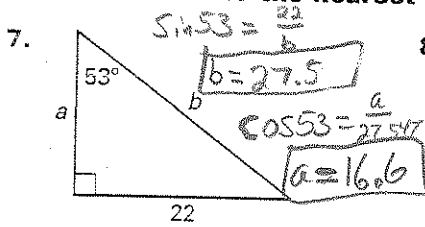
Find  $\sin R$  and  $\sin S$ . Write each answer as a fraction and as a decimal. Round to four decimal places, if necessary.



Find  $\cos A$  and  $\cos B$ . Write each answer as a fraction and as a decimal. Round to four decimal places, if necessary.

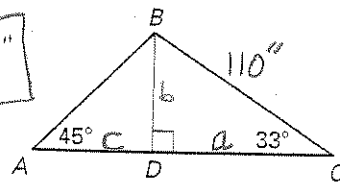


Use a sine or cosine ratio to find the value of each variable. Round decimals to the nearest tenth.



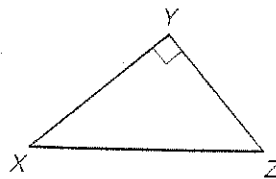
13. Perimeter In the diagram to the right,  $BC = 110$  inches. What is the perimeter? Round your answer to the nearest tenth.

$\cos 33 = \frac{a}{110} \Rightarrow a = 92.2537$   $\sin 33 = \frac{b}{110} \Rightarrow b = 59.91$   $b = c$   $AC = 152.164$   $AB = 59.91\sqrt{2}$   $P = 346.9$

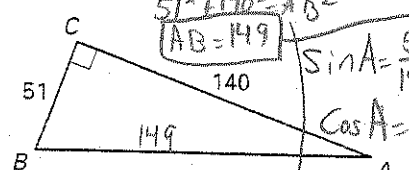


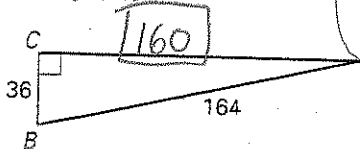
14. Multiple Choice In the diagram to the right,  $XY \neq YZ$ . Which statement about  $\triangle XYZ$  cannot be true?

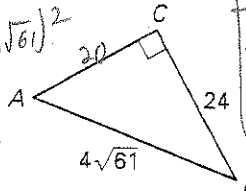
- A.  $\sin X = 0.6293$  **B.  $\cos Z = 0.5$**    
 C.  $\sin X = \cos Z$  **D.  $\sin X = \cos X$**

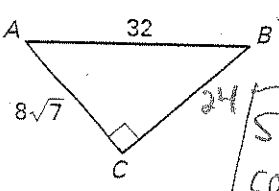


Find the unknown side length. Then find  $\sin A$  and  $\cos A$ . Write each answer as a fraction in simplest form and as a decimal. Round to four decimal places, if necessary.

15.   $51^2 + 140^2 = 149^2$   
 $AB = 149$   
 $\sin A = \frac{51}{149} \approx .3423$   
 $\cos A = \frac{140}{149} \approx .9396$

16.   $36^2 + AC^2 = 164^2$   
 $AC = 160$   
 $\sin A = \frac{36}{164} \approx .2195$   
 $\cos A = \frac{160}{164} \approx .9756$

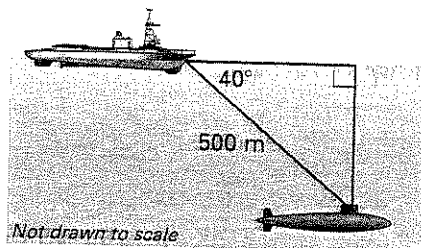
17.   $AC^2 + 20^2 = (4\sqrt{61})^2$   
 $AC = 30$   
 $\sin A = \frac{24}{4\sqrt{61}} \approx .7682$   
 $\cos A = \frac{20}{4\sqrt{61}} \approx .6402$

18.   $(8\sqrt{7})^2 + (BC)^2 = 32^2$   
 $BC = 24$   
 $\sin A = \frac{24}{32} \approx .75$   
 $\cos A = \frac{8\sqrt{7}}{32} \approx .6614$

19. **Submarine** A sonar operator on a ship detects a submarine at a distance of 500 meters and an angle of depression of  $40^\circ$ . How deep is the submarine?

$$\sin 40^\circ = \frac{d}{500}$$

$$d = 321.39 \text{ m}$$

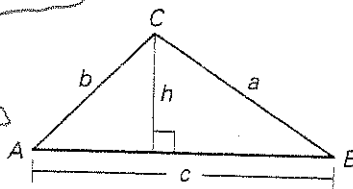


In Exercises 20–22, refer to the diagram at the right.

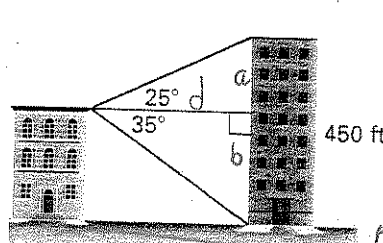
20. Write an expression for  $h$  using  $\angle A$ .  $\sin A = \frac{h}{b}$   $h = b \cdot \sin A$

21. Write an expression for  $h$  using  $\angle B$ .  $h = a \sin B$

22. Show that  $\frac{\sin A}{a} = \frac{\sin B}{b}$ .  $\frac{b \cdot \sin A}{ab} = \frac{a \cdot \sin B}{ab} \rightarrow \frac{\sin A}{a} = \frac{\sin B}{b}$



23. **Height of a Building** A 450 foot tall building is near a shorter building. A person on top of the shorter building finds the angle of elevation of the roof of the taller building to be  $25^\circ$  and the angle of depression of its base to be  $35^\circ$ . How far apart are the two buildings to the nearest foot? How tall is the shorter building to the nearest foot?



$$\tan 35^\circ = \frac{b}{a} \quad \tan 25^\circ = \frac{a}{d}$$

$$d \tan 35^\circ = b \quad d \tan 25^\circ = a$$

$$a + b = d \tan 35^\circ + d \tan 25^\circ$$

$$450 = d(\tan 35^\circ + \tan 25^\circ)$$

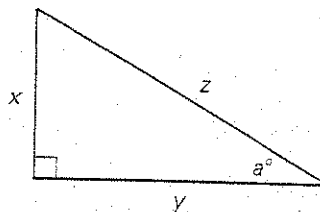
$$b = 270.115$$

$$385.76 = d$$

4. Write an expression for  $(\sin a^\circ)^2 + (\cos a^\circ)^2$  in terms of  $x$ ,  $y$ , and  $z$ . Then use the Pythagorean Theorem to simplify the expression.

$$\sin a = \frac{x}{z} \quad \cos a = \frac{y}{z}$$

$$\frac{x^2}{z^2} + \frac{y^2}{z^2} \rightarrow \frac{x^2 + y^2}{z^2} \rightarrow \frac{z^2}{z^2} = 1$$



the opposite leg is always shorter than the hypotenuse

7. **Critical Thinking** Explain why the sine ratio is always less than or equal to 1.
8. **Critical Thinking** Explain why the cosine ratio is always less than or equal to 1.

the adjacent leg is always shorter than the hypotenuse