

# SOH - CAH - TOA

## Review for Unit 7 Test, U7H7

Name: Key Per: \_\_\_\_\_

1) Simplify the radicals so that they are in simplest radical form.

a)  $2\sqrt{121}$   
 $2 \cdot 11$   
 $(22)$

b)  $\frac{15}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$   
 $\frac{15\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{15\sqrt{5}}{5} = \boxed{3\sqrt{5}}$

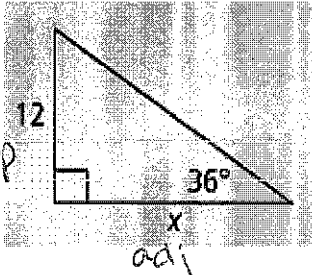
c)  $\sqrt{63}$   
 $\sqrt{9 \cdot 7}$   
 $3\sqrt{7}$

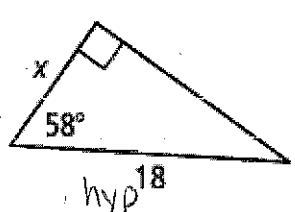
d)  $\sqrt{180}$   
 $\sqrt{36 \cdot 5}$   
 $6\sqrt{5}$

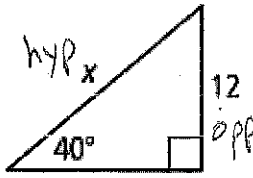
e)  $\frac{22}{6\sqrt{11}} = \frac{11}{3\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}}$   
 $\frac{11\sqrt{11}}{3\sqrt{11} \cdot \sqrt{11}} = \frac{11\sqrt{11}}{3 \cdot 11} = \boxed{\frac{\sqrt{11}}{3}}$

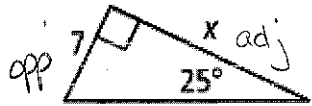
f)  $\sqrt{24} \cdot \sqrt{12} = \sqrt{288}$   
 $\sqrt{144 \cdot 2}$   
 $12\sqrt{2}$

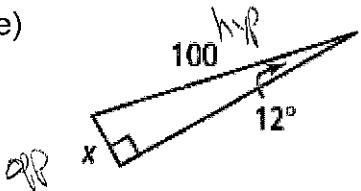
2) Find the missing side lengths. Round answers to the nearest tenth. Figures are not to scale.

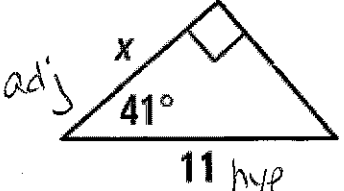
a)   $\tan 36 = \frac{12}{x}$   
 $x \tan 36 = 12$   
 $\frac{x \tan 36}{\tan 36} = \frac{12}{\tan 36}$   
 $x = 16.5$

b)   $\cos 58 = \frac{x}{18}$   
 $18 \cos 58 = x$   
 $x = 9.5$

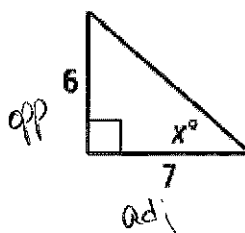
c)   $\sin 40 = \frac{12}{x}$   
 $x \sin 40 = 12$   
 $\frac{x \sin 40}{\sin 40} = \frac{12}{\sin 40}$   
 $x = 18.7$

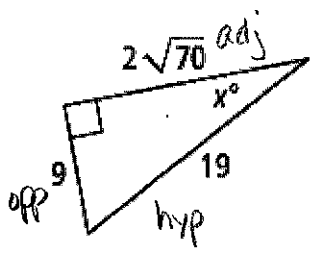
d)   $\tan 25 = \frac{7}{x}$   
 $x \tan 25 = 7$   
 $\frac{x \tan 25}{\tan 25} = \frac{7}{\tan 25}$   
 $x = 15$

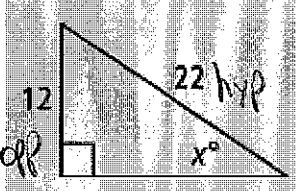
e)   $\sin 12 = \frac{x}{100}$   
 $100 \sin 12 = x$   
 $x = 20.8$

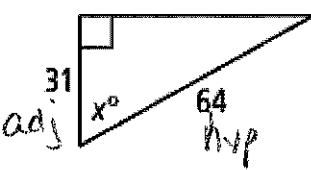
f)   $\cos 41 = \frac{x}{11}$   
 $11 \cos 41 = x$   
 $x = 8.3$

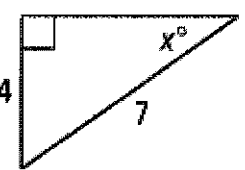
3) Find the missing angle sizes. Round answers to the nearest tenth. Figures are not to scale.

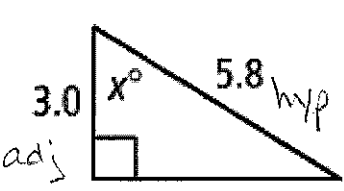
a)   $\tan x = \frac{6}{7}$   
 $\tan^{-1}\left(\frac{6}{7}\right) = x$   
 $X = 40.6^\circ$

b)   $\sin x = \frac{9}{19}$  (could use any trig)  
 $\sin^{-1}\left(\frac{9}{19}\right)$   
 $X = 28.3^\circ$

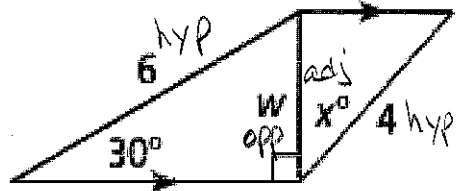
c)   $\sin x = \frac{12}{22}$   
 $\sin^{-1}\left(\frac{12}{22}\right)$   
 $X = 33.1^\circ$

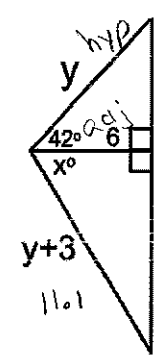
d)   $\cos x = \frac{31}{64}$   
 $\cos^{-1}\left(\frac{31}{64}\right)$   
 $X = 61^\circ$

e)   $\sin x = \frac{4}{7}$   
 $\sin^{-1}\left(\frac{4}{7}\right)$   
 $X = 34.8^\circ$

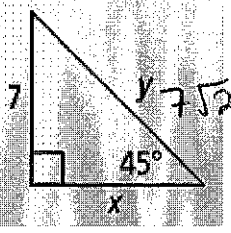
f)   $\cos x = \frac{3}{5.8}$   
 $\cos^{-1}\left(\frac{3}{5.8}\right)$   
 $X = 58.9^\circ$

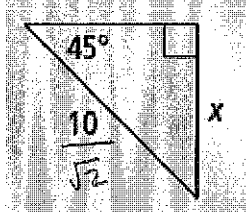
4) Find the missing values. Round answers to the nearest tenth. Figures are not to scale.

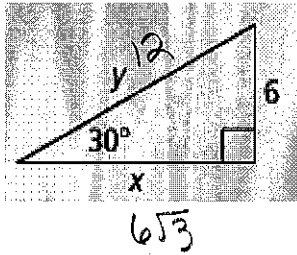
a)   $\sin 30 = \frac{w}{6}$   
 $6 \sin 30 = w$   
 $w = 3$   
 $\cos x = \frac{3}{4}$   
 $\cos^{-1}\left(\frac{3}{4}\right)$   
 $X = 41.4^\circ$

b)   $\cos 42 = \frac{6}{y}$   
 $y \cos 42 = 6$   
 $y = \frac{6}{\cos 42}$   
 $y = 8.1$   
 $\cos x = \frac{6}{11.1}$   
 $\cos^{-1}\left(\frac{6}{11.1}\right)$   
 $X = 57.3^\circ$

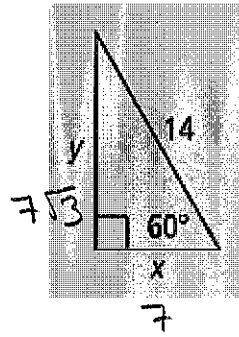
5) Find the missing values for the special right triangles.

a)   $y = 7\sqrt{2}$   
 $x = 7$

b)   $\frac{10}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{10\sqrt{2}}{\sqrt{4}} = \frac{10\sqrt{2}}{2} = 5\sqrt{2}$   
 $x = 5\sqrt{2}$

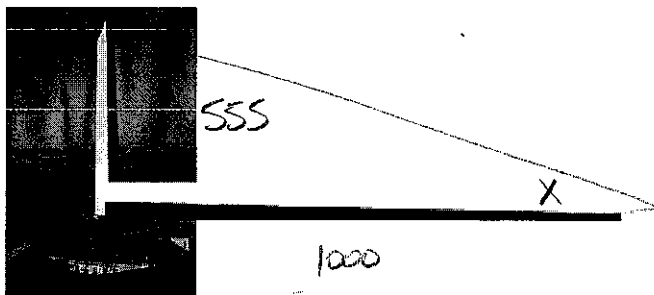


c)



d)

6) The Washington Monument in Washington, D.C. stands 555 feet tall. At a certain time of day, the monument casts a shadow 1000 feet long. What is the angle of elevation of the sun at that time of day?

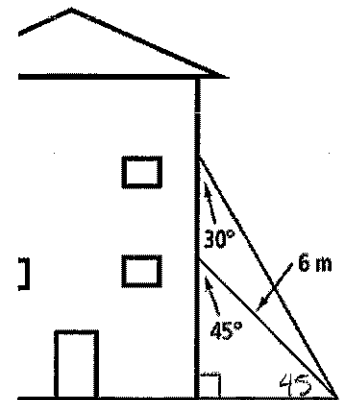


$$\tan X = \frac{555}{1000}$$

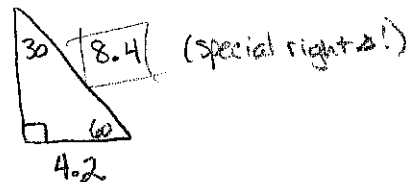
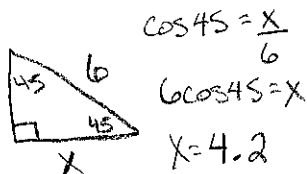
$$\tan^{-1} \left( \frac{555}{1000} \right)$$

$$\boxed{29^\circ}$$

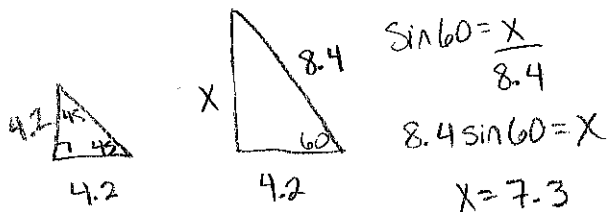
7) After heavy winds damaged a house, workers placed a 6 meter brace against its side at a  $45^\circ$  angle. Then, at the same spot on the ground, they placed a second, longer brace to make a  $30^\circ$  angle with the side of the house.



a. How long is the longer brace? Round to the nearest tenth of a meter.



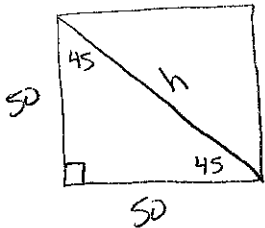
b. About how much higher does the longer brace reach than the shorter brace?



$$7.3 - 4.2 = \boxed{3.1 \text{ m}}$$

- 8) A square garden has sides 50 ft long. You stretch a hose from one corner of the garden to another corner along the garden's diagonal. To the nearest tenth, how long is the hose?

Hint: Draw a picture!



$$h = \sqrt{50^2 + 50^2}$$

(special right  $\Delta$   
45-45-90)

or

$$\sin 45 = \frac{50}{h}$$

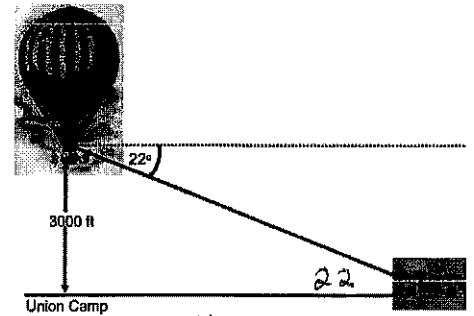
$$h \sin 45 = 50$$

$$h = \frac{50}{\sin 45}$$

$$\boxed{70.7}$$

- 9) In the Civil War, the North used balloons to spy on enemy positions.

- a) If the balloon is 3,000 feet high with a  $22^\circ$  angle of depression sighting to the enemy position, how far was the enemy from the Union Camp?



$$\tan 22 = \frac{3000}{X}$$

$$X \tan 22 = 3000$$

$$X = \frac{3000}{\tan 22}$$

$$\boxed{7425.3 \text{ ft}}$$

- b) The Springfield Rifle Musket could shoot up to 500 yards. (1 yard = 3 feet) Can the enemy successfully shoot down the balloon?



$$\sin 22 = \frac{3000}{X}$$

$$X \sin 22 = 3000$$

$$X = \frac{3000}{\sin 22}$$

$$X = 8008 \text{ ft}$$

$$500 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 1500 \text{ ft}$$

no, the distance is much farther than the cannon can shoot.