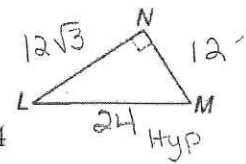


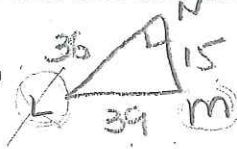
7.4 & 7.5 Practice

Name: Key

Use $\triangle LMN$ to find $\sin L$, $\cos L$, $\tan L$, $\sin M$, $\cos M$, and $\tan M$. Express each ratio as a fraction and as a decimal to the nearest hundredth.



1. $l = 15, m = 36, n = 39$



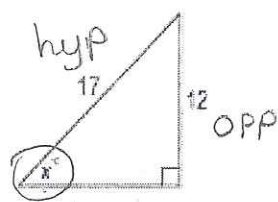
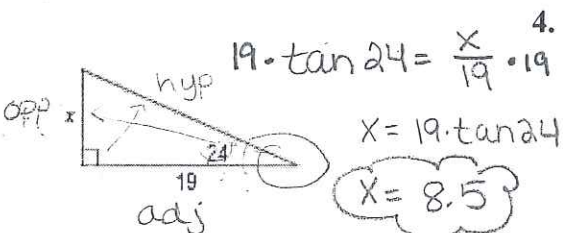
2. $l = 12, m = 12\sqrt{3}, n = 24$

$\sin L = \frac{o}{h} = \frac{15}{39} = 0.38$
 $\cos L = \frac{a}{h} = \frac{36}{39} = 0.92$
 $\tan L = \frac{o}{a} = \frac{15}{36} = 0.42$
 $\sin M = \frac{36}{39} = 0.92$
 $\cos M = \frac{15}{39} = 0.38$

$\sin L = \frac{12}{24} = 0.50$
 $\cos L = \frac{12\sqrt{3}}{24} = 0.87$
 $\tan L = \frac{12}{12\sqrt{3}} = 0.71$
 $\sin M = \frac{12\sqrt{3}}{24} = 0.87$
 $\cos M = \frac{12}{24} = 0.50$
 $\tan M = \frac{12}{12} = 1.00$

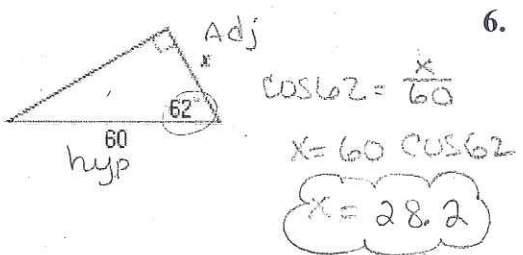
Find x . Round to the nearest tenth.

3.

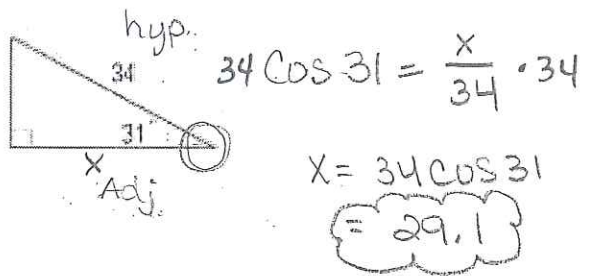


$\sin x = \frac{12}{17}$
 $x = \sin^{-1}(\frac{12}{17})$
 $x = 44.9^\circ$

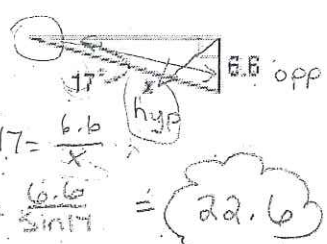
5.



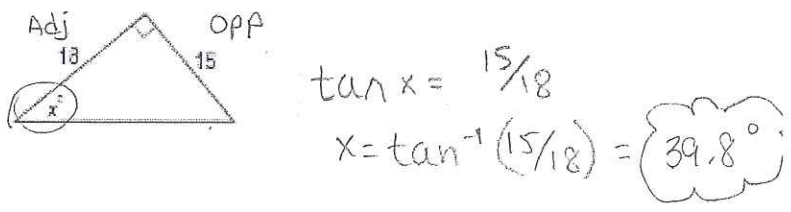
6.



7.

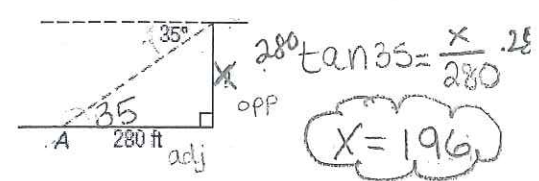


8.



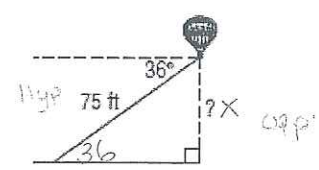
Solve each problem. Round measures of segments to the nearest whole number and angles to the nearest degree.

9. The angle of depression from the top of a sheer cliff to point A on the ground is 35° . If point A is 280 feet from the base of the cliff, how tall is the cliff?



10.

The angle of depression from a balloon on a 75-foot string to a person on the ground is 36° . How high is the balloon?

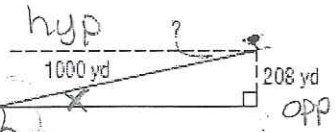


$\sin 36 = \frac{x}{75}$
 $x = 75 \sin 36 = 44$

11. A ski run is 1000 yards long with a vertical drop of 208 yards. Find the angle of depression from the top of the ski run to the bottom.

$$\sin x = \frac{208}{1000}$$

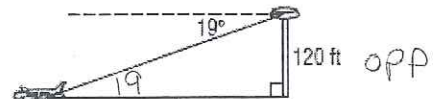
$$x = \sin^{-1}\left(\frac{208}{1000}\right) = 12^\circ$$



12. From the top of a 120-foot-high tower, an air traffic controller observes an airplane on the runway at an angle of depression of 19° . How far from the base of the tower is the airplane?

$$\tan 19 = \frac{120}{x}$$

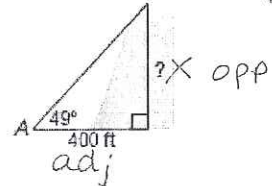
$$x = \frac{120}{\tan 19} = 349$$



13. The angle of elevation from point A to the top of a hill is 49° . If point A is 400 feet from the base of the hill, how high is the hill?

$$\tan 49 = \frac{x}{400}$$

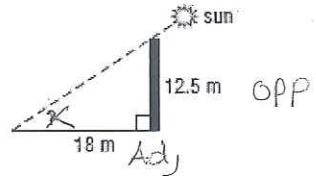
$$x = 400 \tan 49 = 460$$



14. Find the angle of elevation of the sun when a 12.5-meter-tall telephone pole casts a 18-meter-long shadow.

$$\tan x = \frac{12.5}{18}$$

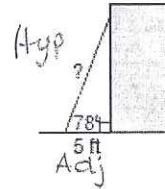
$$x = \tan^{-1}\left(\frac{12.5}{18}\right) = 34.8^\circ$$



15. A ladder leaning against a building makes an angle of 78° with the ground. The foot of the ladder is 5 feet from the building. How long is the ladder?

$$\cos 78 = \frac{5}{x}$$

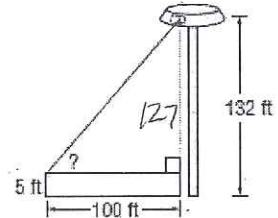
$$x = \frac{5}{\cos 78} = 24.0$$



16. A person whose eyes are 5 feet above the ground is standing on the runway of an airport 100 feet from the control tower. That person observes an air traffic controller at the window of the 132-foot tower. What is the angle of elevation?

$$\tan x = \frac{127}{100}$$

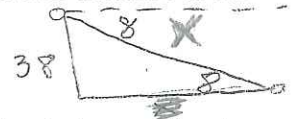
$$x = \tan^{-1}\left(\frac{127}{100}\right) = 51.8^\circ$$



17. From her position in a hot-air balloon, Angie can see her car parked in a field. If the angle of depression is 8° and Angie is 38 meters above the ground, what is the straight-line distance from Angie to her car? Round to the nearest whole meter.

$$\sin 8 = \frac{38}{x}$$

$$x = \frac{38}{\sin 8} = 273$$

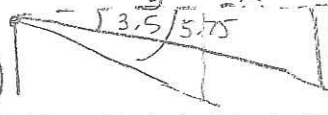


18. An observer in the top of a lighthouse determines that the angles of depression to two sailboats directly in line with the lighthouse are 3.5° and 5.75° . If the observer is 125 feet above sea level, find the distance between the boats.

$$\tan 3.5 = \frac{125}{x}$$

$$x = \frac{125}{\tan 3.5} = 2043.7$$

$$2043.7 - 1241.4 = 802.3$$



$$\tan 5.75 = \frac{125}{x}$$

$$x = \frac{125}{\tan 5.75} = 1241.4$$

19. On a mountain bike trip along the Gemini Bridges Train in Moab, Utah, Nabuko stopped on the canyon floor to get a good view of the twin sandstone bridges. Nabuko is standing about 60 meters from the base of the canyon cliff, and the natural arch bridges are about 100 meters up the canyon wall. If her line of sight is five feet above the ground, what is the angle of elevation to the top of the bridges? Round to the nearest tenth of a degree.

$$\tan x = \frac{95}{60}$$

$$x = \tan^{-1}\left(\frac{95}{60}\right) = 57.7^\circ$$

