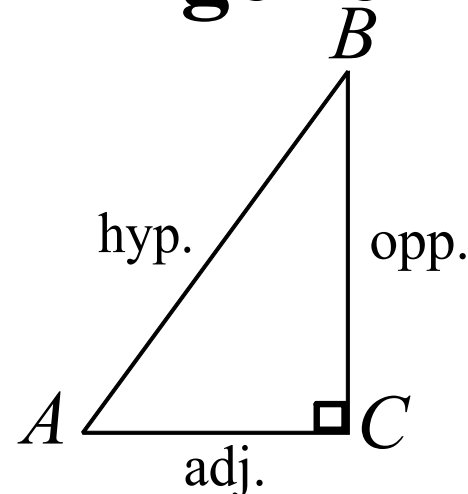


13.1- Right-Triangle Trigonometry



Trigonometric Functions of $\angle A$.

$$\text{sine of } \angle A = \frac{\text{opp.}}{\text{hyp.}}$$

$$\text{cosecant of } \angle A = \frac{\text{hyp.}}{\text{opp.}}$$

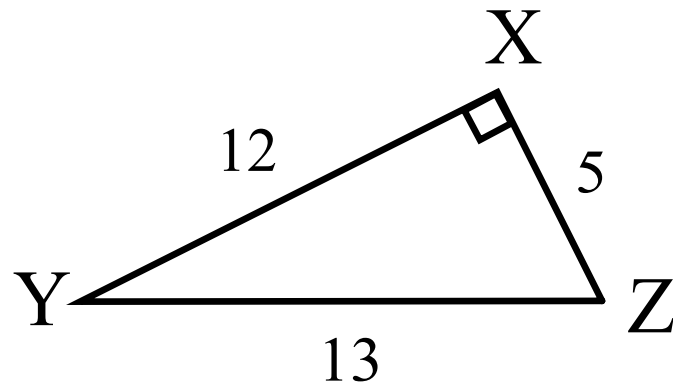
$$\text{cosine of } \angle A = \frac{\text{adj.}}{\text{hyp.}}$$

$$\text{secant of } \angle A = \frac{\text{hyp.}}{\text{adj.}}$$

$$\text{tangent of } \angle A = \frac{\text{opp.}}{\text{adj.}}$$

$$\text{cotangent of } \angle A = \frac{\text{adj.}}{\text{opp.}}$$

S O H C A H T O A
i p y o d y a p d
n p p s j p n p j
o o a o o a
s t c t s c
i e e e i e
t n n n t n
e u t u e t
s
e e

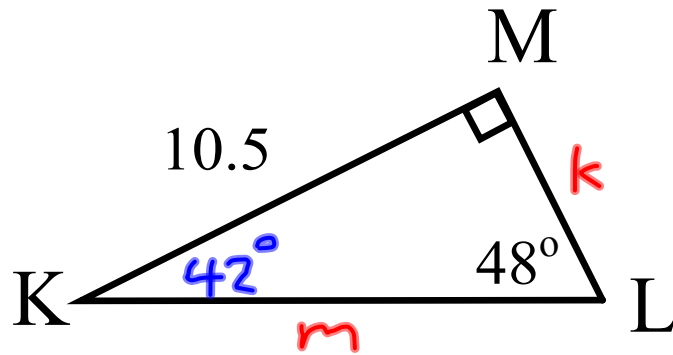


Find the values of the six trigonometric functions of $\angle Y$ for $\triangle XYZ$. Give exact answers and answers rounded to the nearest ten-thousandth.

$$\sin Y = \frac{5}{13} \approx .3846 \quad \csc Y = \frac{13}{5} \approx 2.6000$$

$$\cos Y = \frac{12}{13} \approx .9231 \quad \sec Y = \frac{13}{12} \approx 1.0833$$

$$\tan Y = \frac{5}{12} \approx .4167 \quad \cot Y = \frac{12}{5} \approx 2.4000$$



For $\triangle KLM$ shown above, find KL and LM to the nearest tenth.

$$10.5 \left[\tan 42^\circ = \frac{k}{10.5} \right]$$

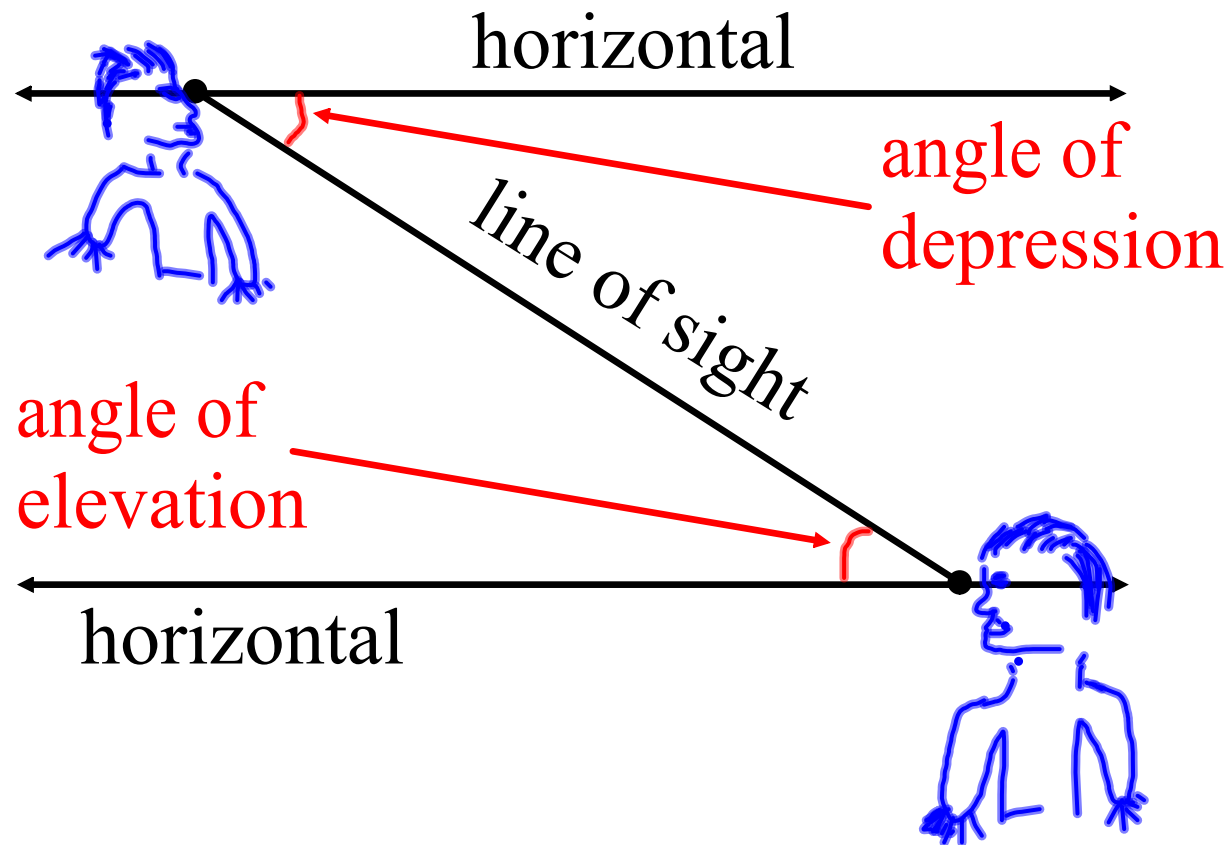
$$10.5 \tan 42^\circ = k = 9.5$$

$$\sin 48^\circ = \frac{10.5}{m}$$

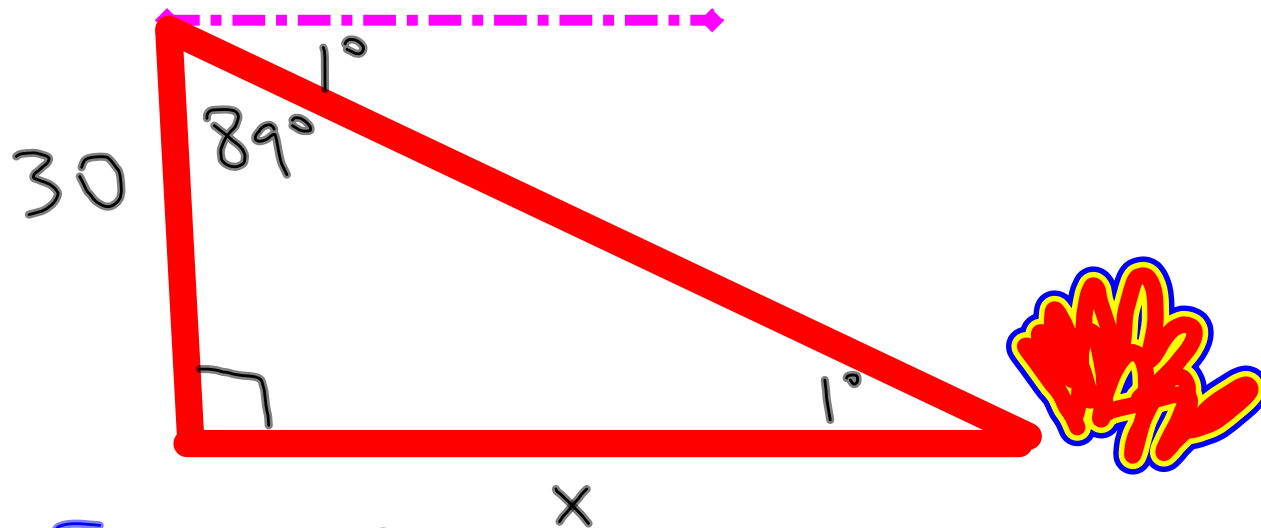
$$m = \frac{10.5}{\sin 48^\circ}$$

$$m = 14.1$$

An **angle of elevation** is an angle between a horizontal line and a line of sight to a point above.
An **angle of depression** is an angle between a horizontal line and a line of sight to a point below.



The height of an observation tower in a state park is 30 feet. A ranger at the top of the tower sees a fire along a line of sight that is at a 1° angle of depression. How far is the fire from the base of the tower? Round your answer to the nearest foot.



$$\tan 1^\circ = \frac{30}{x}$$

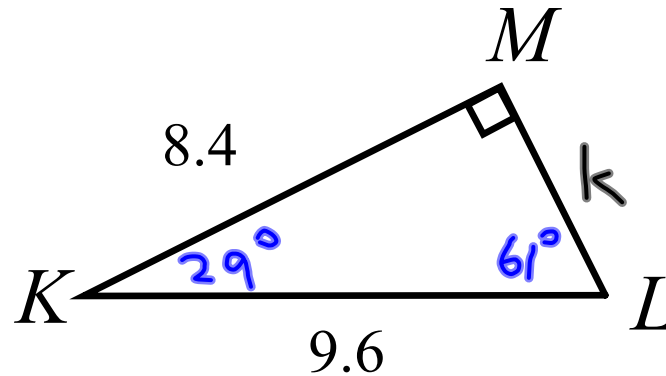
$$x = \frac{30}{\tan 1^\circ} = 1719 \text{ ft.}$$

Solve $\triangle KLM$. Give $m\angle K$ and $m\angle L$ to the nearest degree and LM to the nearest tenth of a unit.

$$\sin L = \frac{8.4}{9.6}$$

$$L = \sin^{-1} \frac{8.4}{9.6}$$

$$L = 61^\circ$$



$$9.6 \left[\sin 29^\circ = \frac{k}{9.6} \right]$$

$$9.6 \sin 29^\circ = k = 4.7$$

Solve the triangle. Give angle measures to the nearest degree and side lengths to the nearest tenth.

$$\cos A = \frac{3.3}{3.9}$$

$$A = \cos^{-1} \frac{3.3}{3.9}$$

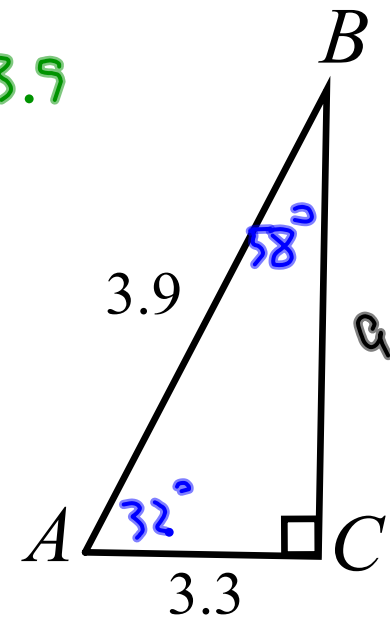
$$A = 32^\circ$$

$$B = 58^\circ$$

$$\left(\sin 32^\circ = \frac{a}{3.9} \right) 3.9$$

$$3.9 \sin 32^\circ = a$$

$$a = 2.1$$



Homework

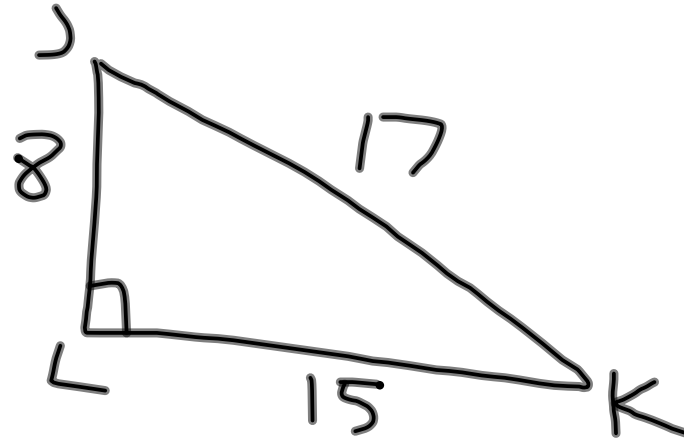
Pg. 833-834 #8-18 even, 21-31 odd, 36-46 even

14)

csc)

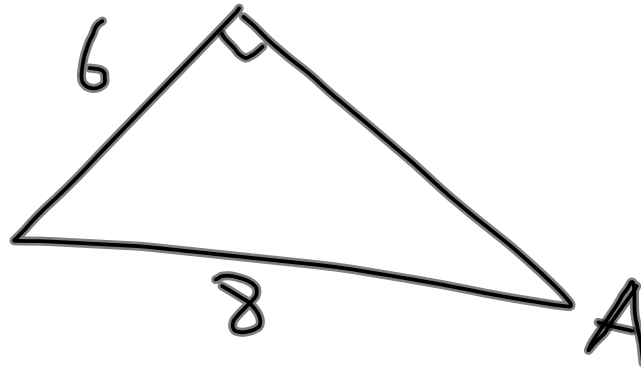
$$\sin) = \frac{15}{17}$$

$$\text{csc}) = \frac{17}{15}$$



36)

$$\sin A = \frac{6}{8}$$



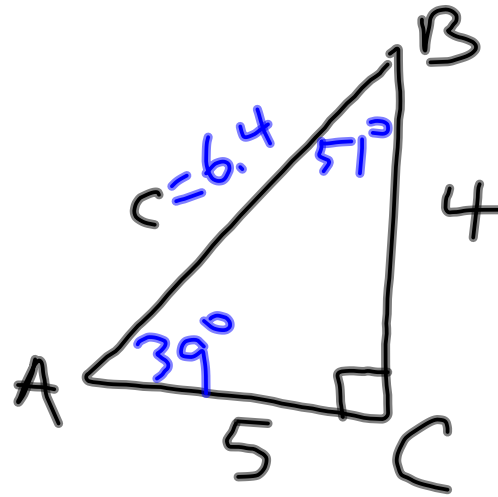
$$A = \sin^{-1} \frac{6}{8} = 48.6^\circ$$

38)

$$\tan A = \frac{4}{5}$$

$$A = \tan^{-1} \frac{4}{5}$$

$$\begin{aligned} A &= 39^\circ \\ B &= 51^\circ \\ c &= 6.4 \end{aligned}$$



$$\sin 39^\circ = \frac{4}{c}$$

$$c = \frac{4}{\sin 39^\circ}$$

$$c = 6.4$$

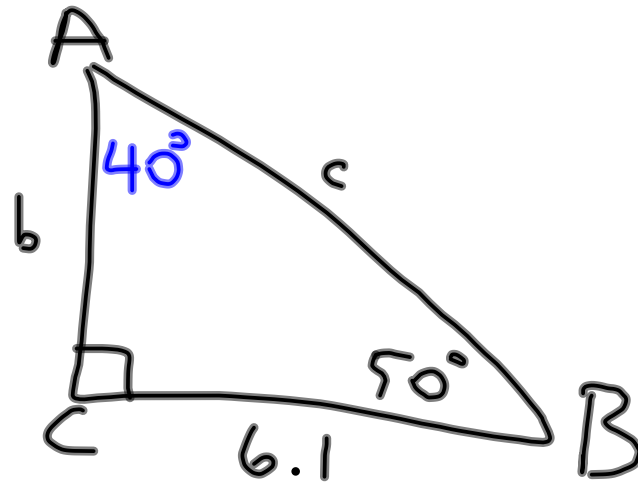
40)

$$6.1 \left[\tan 50^\circ = \frac{b}{6.1} \right]$$

$$6.1 \tan 50^\circ = b = 7.3$$

$$\cos 50^\circ = \frac{6.1}{c}$$

$$c = \frac{6.1}{\cos 50^\circ} = 9.5$$



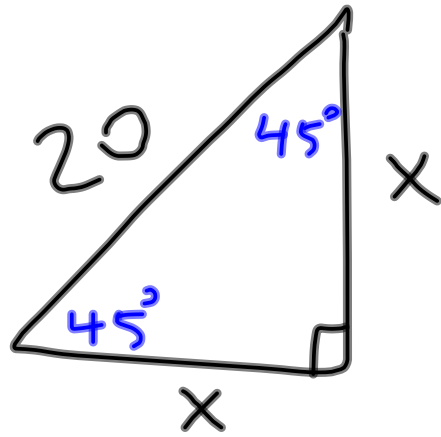
$$44) \quad \tan A = \frac{\sin A}{\cos A}$$

$$\frac{\text{opp.}}{\text{adj.}} = \frac{\frac{\text{opp.}}{\text{hyp}}}{\frac{\text{adj.}}{\text{hyp}}}$$

$$\frac{\text{opp.}}{\text{adj.}} = \frac{\text{opp.}}{\cancel{\text{hyp}}} \cdot \frac{\cancel{\text{hyp}}}{\text{adj.}}$$

$$\frac{\text{opp.}}{\text{adj.}} = \frac{\text{opp.}}{\text{adj.}}$$

46)



a)

$$20 \left[\sin 45^\circ = \frac{x}{20} \right]$$

$$20 \sin 45^\circ = x = \boxed{14.1 \text{ ft.}}$$

$$b) \frac{1}{2} (14.1)(14.1) = \boxed{99.4 \text{ ft}^2}$$