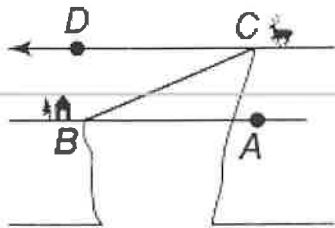


Name _____

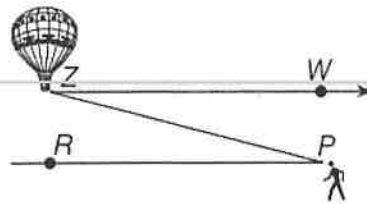
Date _____

Name the angles of elevation and depression in each diagram.



Angle of elevation $\angle ABC$

Angle of depression $\angle DCB$

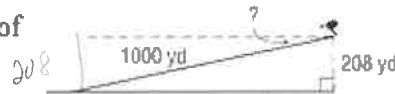


Angle of elevation $\angle RPZ$

Angle of depression $\angle WZP$

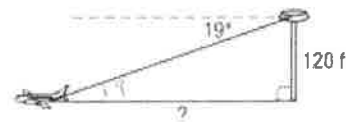
Solve each of the following word problems.

SKIING 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.



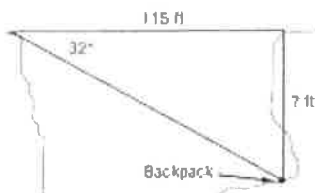
$$\sin x = \frac{208}{1000} \quad 12^\circ$$

AIR TRAFFIC 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?



$$\tan 19 = \frac{120}{x} \quad 348.5 \text{ ft}$$

A hiker dropped his backpack over one side of a canyon onto a ledge below. Because of the shape of the cliff, he could not see exactly where it landed. From the other side, the park ranger reports that the angle of depression to the backpack is 32° . If the width of the canyon is 115 feet, how far down did the backpack fall? Round your answer to the nearest whole foot.



$$\tan 32 = \frac{x}{115} \quad 71.9 \text{ ft}$$

At 2 P.M., the shadow of a lighthouse is 19 feet long and the angle of elevation is 75° . Find the height of the lighthouse.

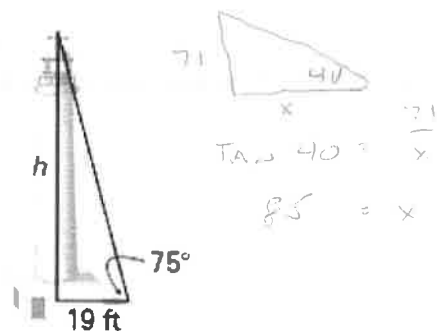
$$\tan 75 = \frac{h}{19} \quad 71 \text{ ft}$$

At 4 P.M., the angle of elevation of the sun is 40° . Find the length of the shadow cast by the lighthouse.

85 ft

At 6 P.M., will the length of the shadow be longer or shorter than it was at 4 P.M.? Explain.

Longer. Setting Sun (lower angle) = longer shadow

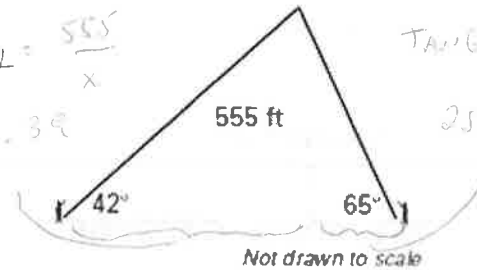


Distance You are on the west side of the Washington Monument which is 555 feet tall. Your friend is on the opposite (east) side. The angle of elevation from your position to the top of the monument is 42° . The angle of elevation from your friend's position to the top of the monument is 65° . To the nearest foot, how far are you from your friend?

$$\tan 42 = \frac{555}{x} \quad 616.39$$

$$\tan 65 = \frac{555}{y} \quad 258.80$$

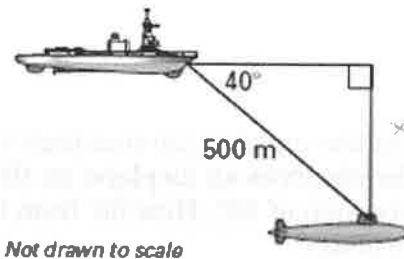
875 ft



Submarine A sonar operator on a ship detects a submarine at a distance of 500 meters and an angle of depression of 40° . How deep is the submarine?

$$\sin 40 = \frac{x}{500}$$

321.39 ft



A boat on a lake is 550 yards from the base of a vertical cliff. The person in the boat looks up to the top of the cliff and notices a person. The boater's angle of elevation to the top of the cliff is 65° .

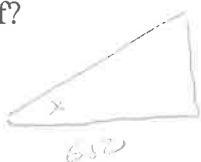
a) Find the height of the cliff.

$$\tan 65 = \frac{x}{550} \quad 1179.5 \text{ yds}$$

b) For the person at the top of the cliff, what is the angle of depression?

65°

c) The boat drifts 100 yards further away from the cliff. What is the new angle of elevation allowing the boater to, again, see the person at the top of the cliff?



$$\tan x = \frac{1179.5}{650}$$

$x = 61.14^\circ$

