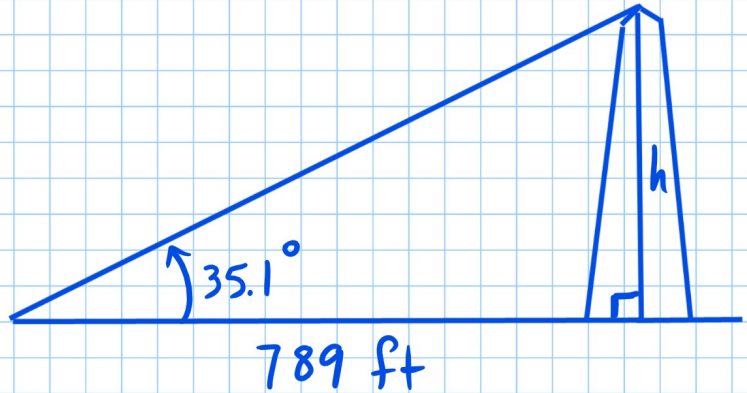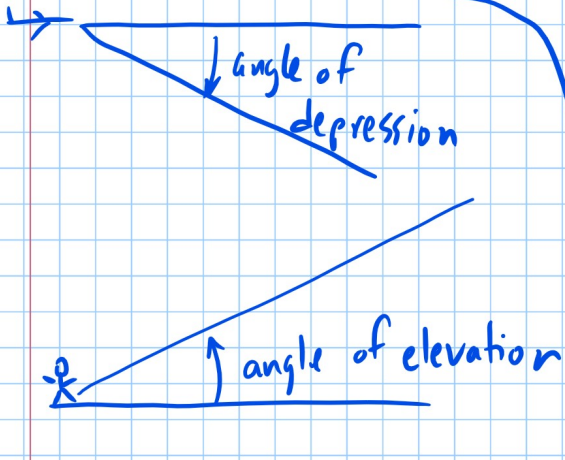The angle of elevation to the top of the Washington Monument is $35.1°$ the instant it casts a shadow 789 feet long. What is the height of the monument?
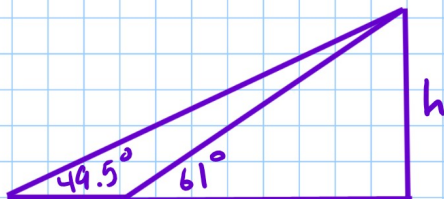
angle of depression

angle of elevation

$35.1°$

789 ft

$$\tan 35.1° = \frac{h}{789}$$

$$789 \tan 35.1° = h$$

$$h = 555 \text{ ft}$$

Word Problems

ex: You are hiking along a river and see a tall tree on the opposite bank. You measure the angle of elevation to the the top of the tree and find it to be $61.0°$. You then walk 50 feet directly backward away from the tree and measure a $49.5°$ angle of elevation. How tall is the tree.
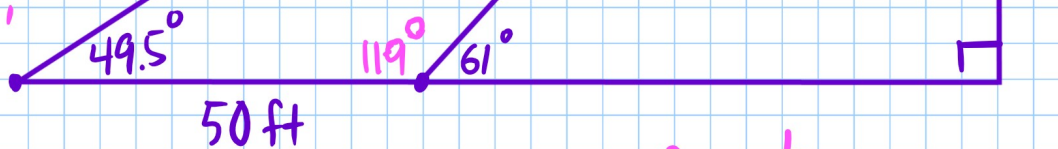
h

$49.5°$ $61°$

$$\frac{\sin 49.5°}{d} = \frac{\sin 11.5°}{50}$$

$$\frac{50 \sin 49.5°}{\sin 11.5°} = d$$

$$d = 190.7'$$

50'

11.5°

$d = 190.7'$

h

49.5°   119°   61°

50 ft

$$\sin 61° = \frac{h}{190.7}$$

$$h = 190.7 \sin 61°$$

$$\boxed{h = 166.8 \text{ ft}}$$

How tall is the Flagpole?

75'   51°   40°

$$\tan 51° = \frac{H}{75} \qquad \tan 40° = \frac{h}{75}$$

$$H = 75 \tan 51° \qquad h = 75 \tan 40°$$

$$H = 92.6 \text{ ft} \qquad h = 62.9 \text{ ft}$$

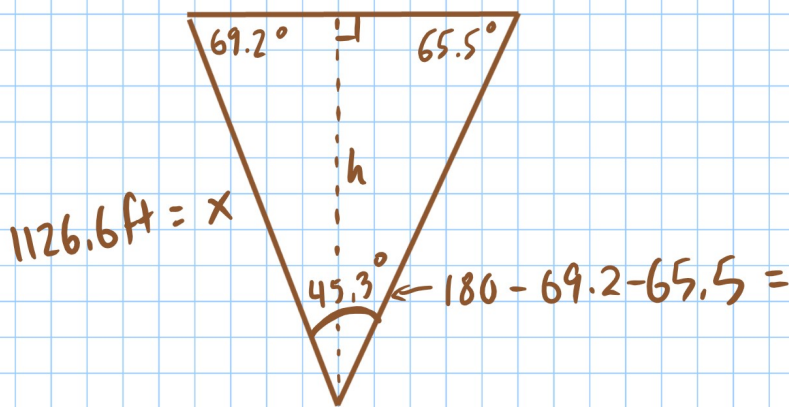$$\text{Flagpole} = 92.6 - 62.9 = 29.7 \text{ ft}$$

p537-538   43, 47, 51, 56
p548-549   30, 31, 33, 34

Lake is at 11200
hotel $\underline{9000}$
2200

56)

l

2200 ft

17°

$\underline{34\ p\ 549}$

←— 880 ft —→

69.2°   65.5°

h

1126.6 ft = x

45.3° ← 180 − 69.2 − 65.5 =

$$\frac{\sin 65.5°}{x} = \frac{\sin 45.3°}{880}$$

$$x = \frac{880 \sin 65.5°}{\sin 45.3°}$$

$$x = 1126.6\ ft$$

$$\sin 69.2° = \frac{h}{1126.6}$$

$$h = 1126.6 \sin 69.2°$$

$$h = 1053.2\ ft$$