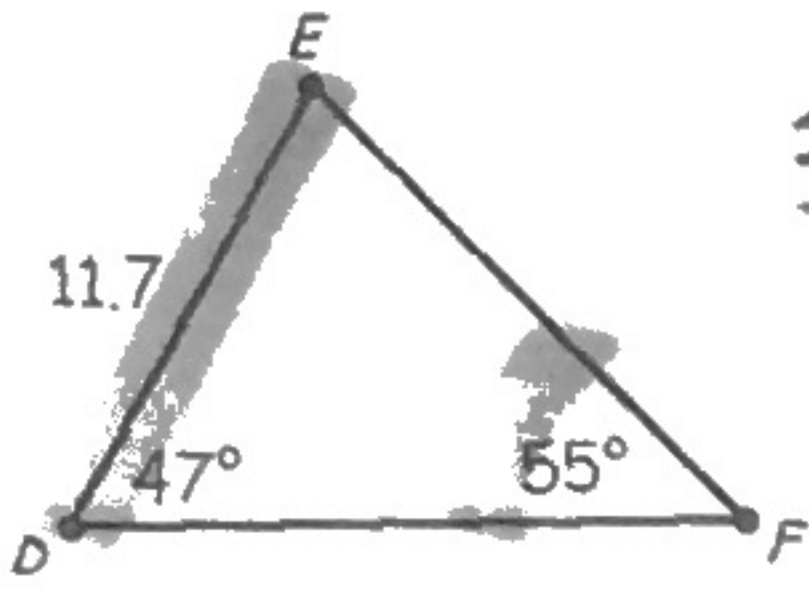Find each indicated measure. A) Show answers in calculator-ready form! B) Round answers to the nearest tenth.

11. Find EF to the nearest tenth.
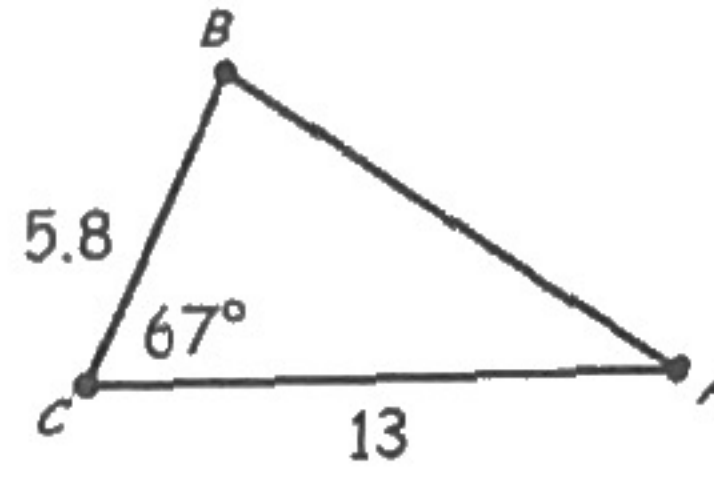
11.7

47°   55°

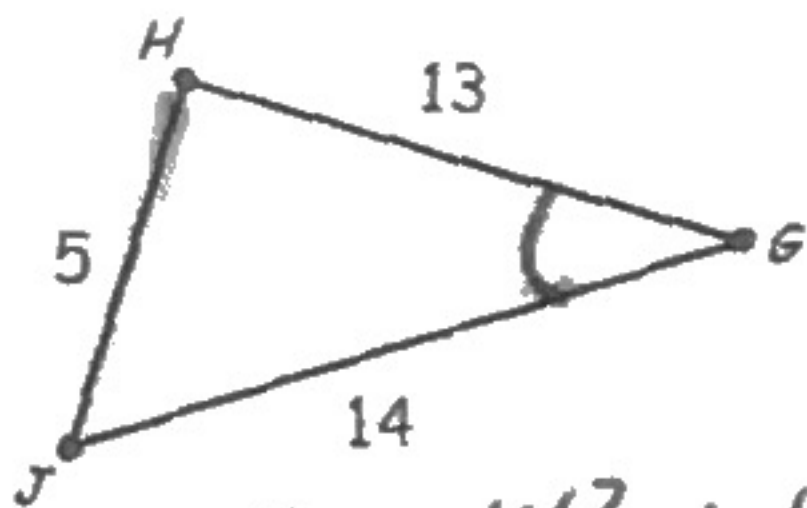$\dfrac{\sin 55}{11.7} = \dfrac{\sin 47}{d}$

$d = \dfrac{11.7 \sin 47}{\sin 55}$

$\boxed{d \approx 10.4}$

12. Find AB to the nearest tenth.

5.8

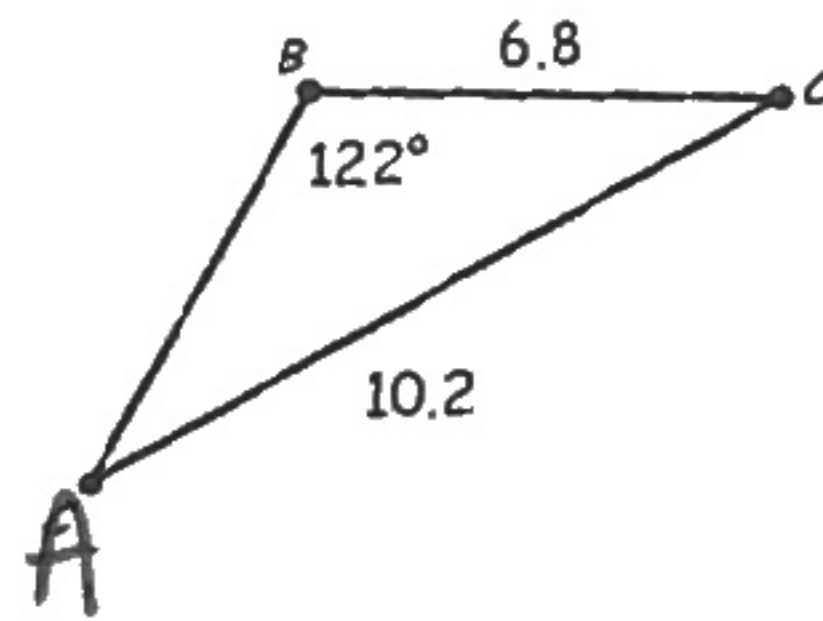67°

13

$\boxed{AB \approx 12}$

13. Find $m\angle G$ to the nearest degree.

H   13

5   G

14

$\cos G = \dfrac{14^2 + 13^2 - 5^2}{2(14)(13)}$

$\boxed{\angle G = 20.9°}$

14. Find $m\angle C$ to the nearest degree.

B   6.8   C

122°

10.2

A

$\boxed{\angle C = 23.6}$

15. Find JK to the nearest tenth.

Find JK

J   20°   20°   K

4.8   140°   4.8 (isosceles)

L

$\dfrac{\sin 20}{4.8} = \dfrac{\sin 140}{x}$

$\boxed{x \approx 9.0}$
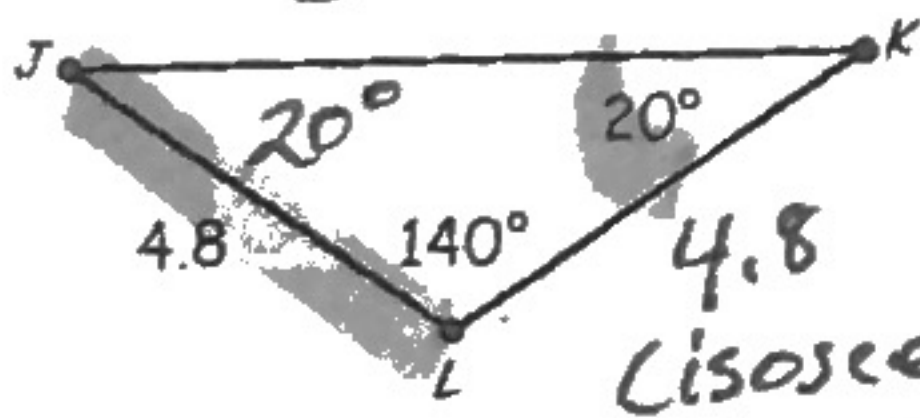
16. Find $m\angle Y$ to the nearest degree.

Y   9.7   X

6.8

14.7

Z
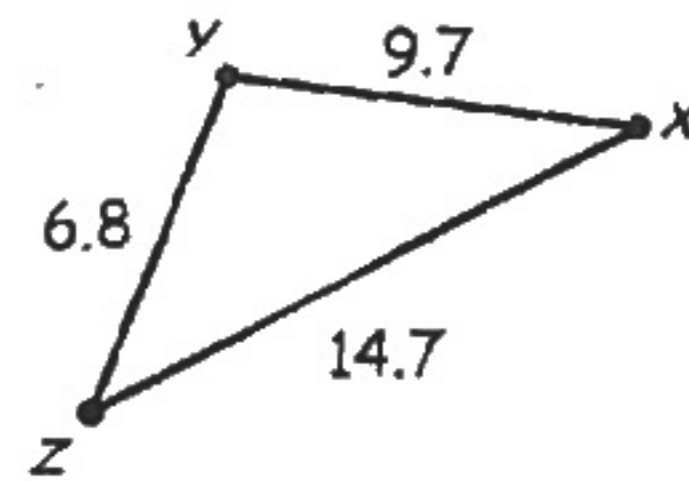
$\boxed{y = 125.0°}$

17. Mark and Javier walk in to the woods along paths that form a 72° angle. If Mark walks at 2.8 miles per hour and Javier walks at 4.2 miles per hour, how far apart will they be after 3 hours? Round to the nearest tenth of a mile.   D=r·t

M   x   J

8.4   72°   12.6
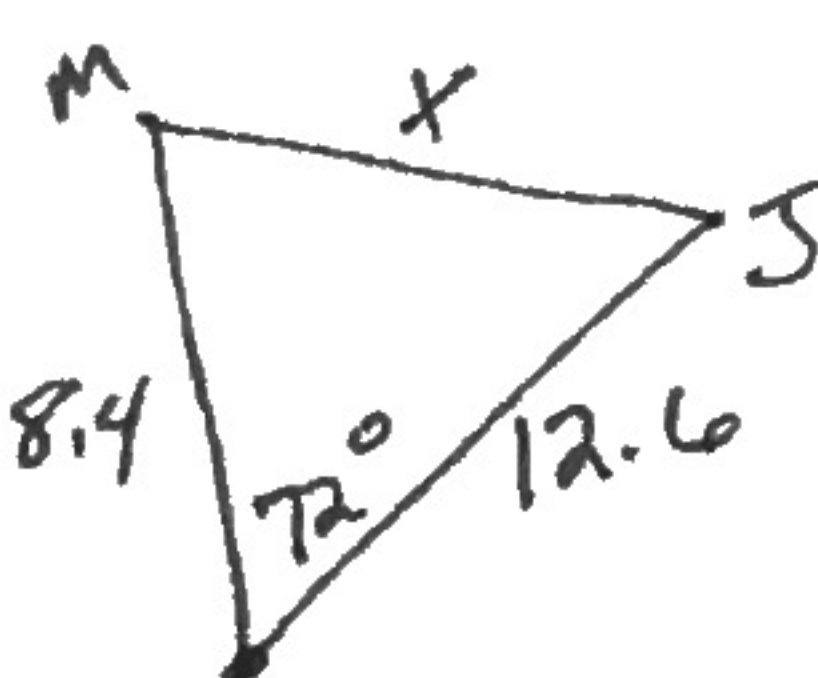
Mark's distance
$D = 2.8(3)$
$= 8.4$ miles
Javier's distance
$D = 4.2(3)$
$D = 12.6$

$x^2 = 8.4^2 + 12.6^2 - 2(8.4)(12.6)\cos 72°$

$\boxed{x \approx 12.8}$

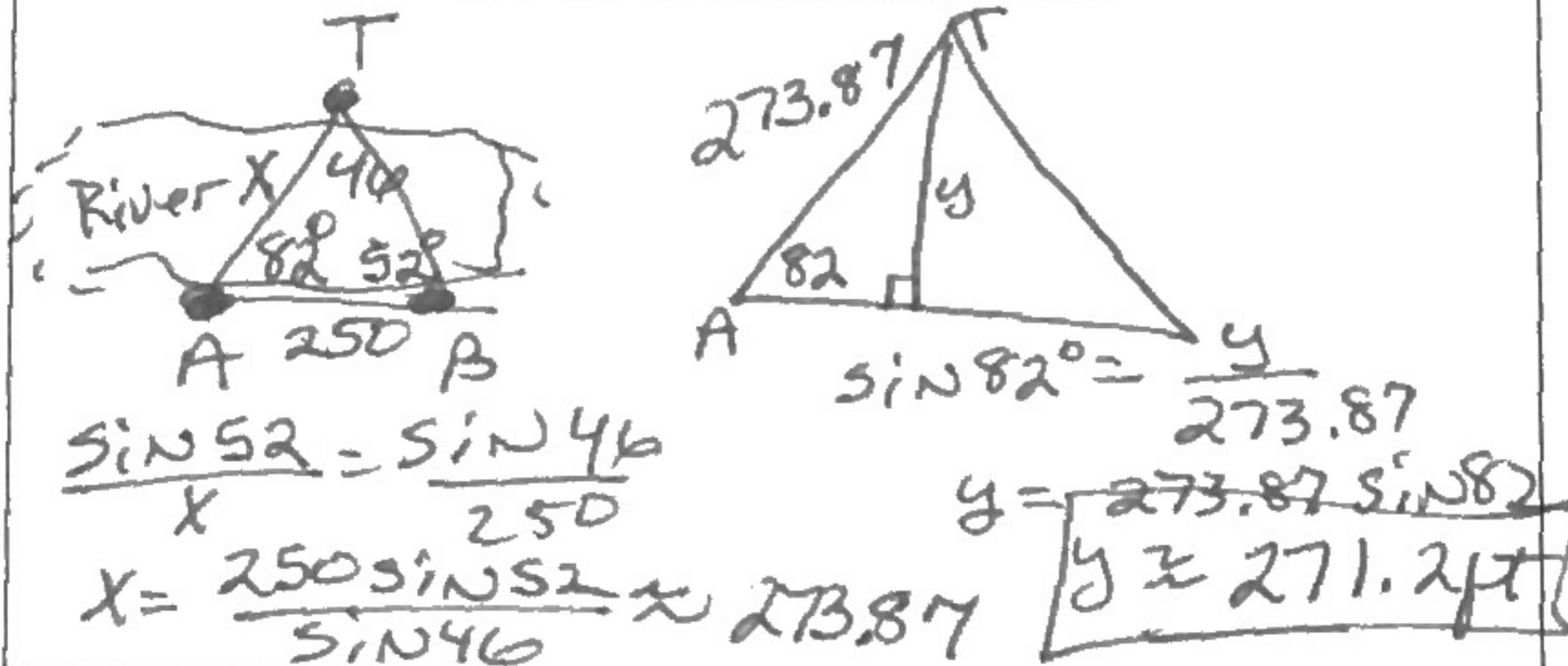**18.** A fire is spotted between two different fire towers that are located 5 miles apart. (The towers have the same height.) From the top of tower A, the angle of depression to the smoke plume is 80°. From tower B, the angle of depression to the smoke plume is 70°. Which tower is closer to the smoke plume based on the diagonal distance? How far is the smoke plume from that tower?
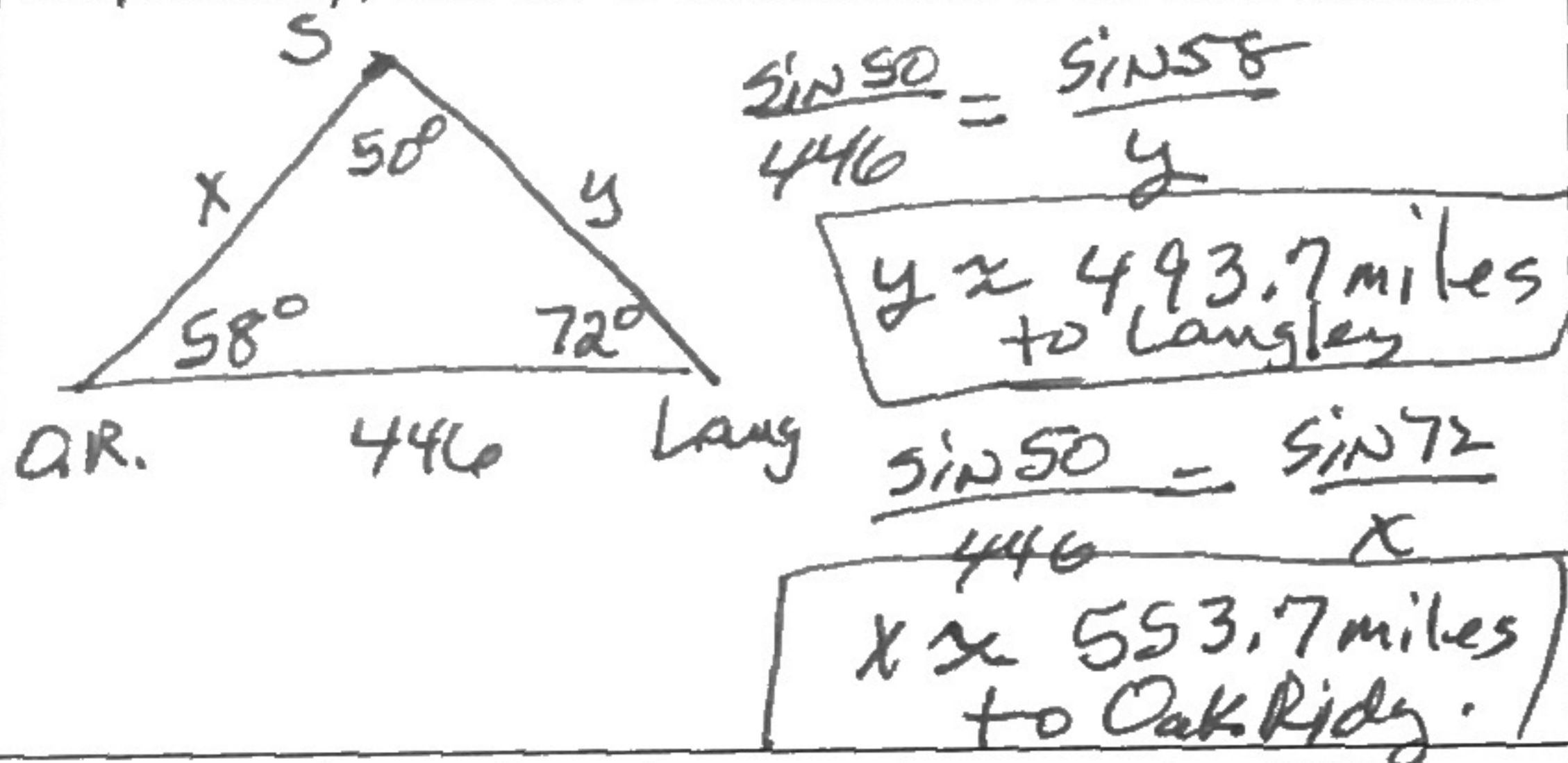
A   5   B

Fire
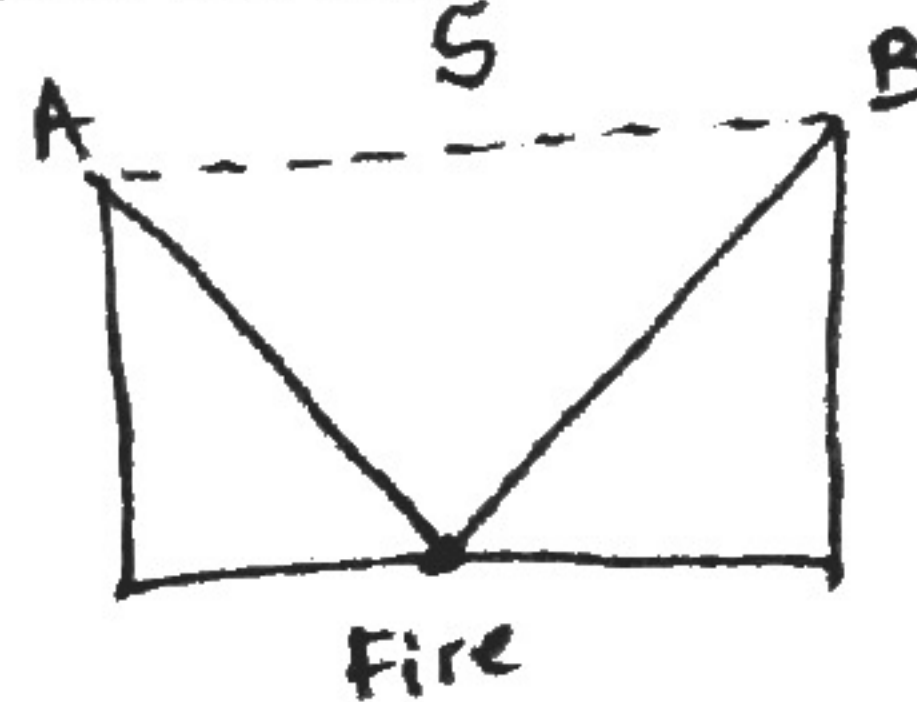
1.63 miles

19. To measure the distance across a river, a surveyor chooses points A and B, which are 250 feet apart on one side of the river bank. He then chooses a large tree as a reference point on the bank of the other side of the river (T) and finds that $m\angle BAT = 82°$ and $m\angle ABT = 52°$. Approximate the distance from A to T, and use this length to estimate the distance across the river to the nearest foot.

T

River X / 46
82 52
A 250 B

$$\frac{\sin 52}{X} = \frac{\sin 46}{250}$$

$$X = \frac{250 \sin 52}{\sin 46} \approx 273.87$$

273.87
82
$\sin 82° = \dfrac{y}{273.87}$

$y = 273.87 \sin 82$

$\boxed{y \approx 271.2 ft}$

20. A pilot intends to fly a distance of 175 miles from Austin to Houston. Without realizing, she begins off course and proceeds for 70 miles before discovering her error. After correcting her course, she has to fly 112 miles to get to Houston. To the nearest degree, how far off course did she veer?

$\boxed{X = 20.3°}$

21. An Earth-orbiting satellite is passing between the Oak Ridge Laboratory in Tennessee and the Langley Research Center in Virginia, which is 446 miles apart. If the angles of elevation to the satellite from the Oak Ridge and Langley facilitates are 58° and 72° respectively, how far is the satellite from each station?

S
X 50° y
58° 72°
O.R. 446 Lang

$$\frac{\sin 50}{446} = \frac{\sin 58}{y}$$

$\boxed{y \approx 493.7 \text{ miles} \\ \text{to Langley}}$

$$\frac{\sin 50}{446} = \frac{\sin 72}{X}$$

$\boxed{X \approx 553.7 \text{ miles} \\ \text{to Oak Ridg.}}$

22. When a hockey player attempts a shot, he is 20 feet from the left post of the goal and 24 feet from the right post. If a regulation hockey goal is 6 feet wide, what is the player's shot angle to the nearest degree?

$\boxed{X = 13.9°}$

23. Lola rolls a ball on the ground at an angle of 23° to the right of her dog Buttons. If the ball rolls a total distance of 48 feet, and she is standing 30 feet away, how far will Buttons have to run to retrieve the ball?

Buttons
run
Ball
30
23° 48
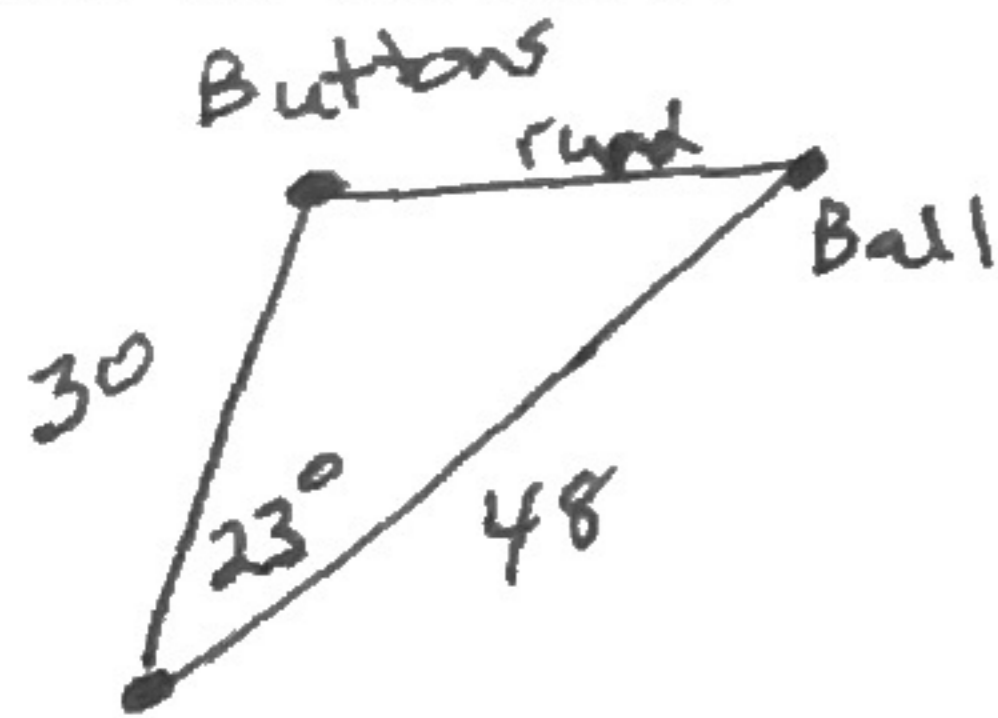
L
$r^2 = 30^2 + 48^2 - 2(30)(48)\cos 23$

$r^2 = 552.94$

$r \approx$ ~~23.5ft~~ $\boxed{23.5 ft}$

24. A 10-meter telephone pole casts a 17-meter shadow directly down a slope when the angle of elevation of the sun is 42°. Find the angle of elevation of the ground.

$\boxed{16.07°}$