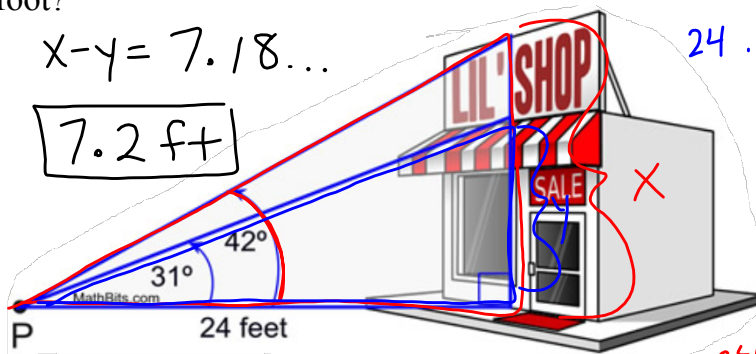**DO NOW**

Simon bought a new shop and wants to order a new sign for the roof of the building. From point P, he finds the angle of elevation of the roof, from ground level, to be 31° and the angle of elevation of the top of the sign to be 42°. If point P is 24 feet from the building, how tall is the sign to the nearest tenth of a foot?

$x - y = 7.18...$

7.2 ft

42°
31°
24 feet
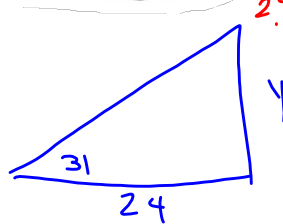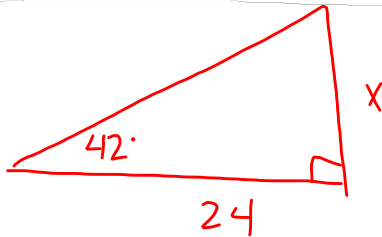P

$24 \cdot \tan 31 = \frac{y}{24} \cdot 24$
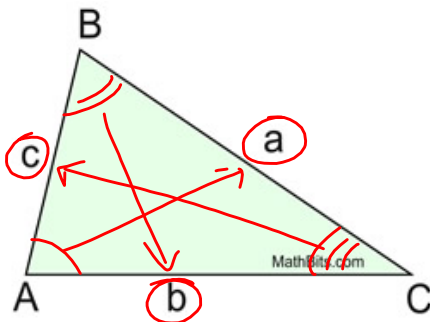
$y = 24(\tan 31)$

$y = 14.420...$

$\tan 42 = \frac{x}{24} \cdot 24$

$x = 24(\tan 42)$

$x = 21.609...$

42°
x
24

31
24
y

An oblique triangle is any triangle that is not a right triangle.

B

c   a

A   b   C

Law of Sines
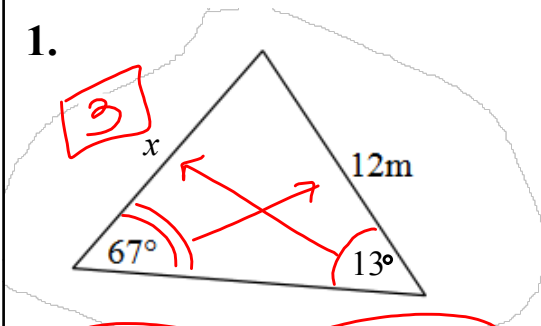
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

NOTICE:
Law of Sines
uses at least 2∠s and
2 respective sides.
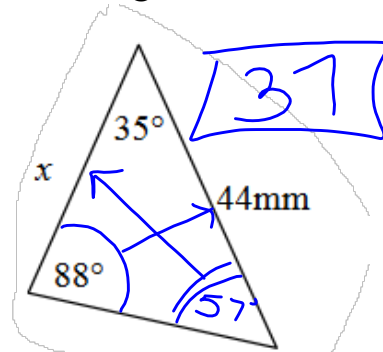
Find x. Round your answer to the nearest integer.

1.

[3]

x 12m

67°   13°

$$\frac{\sin 13}{x} = \frac{\sin 67}{12}$$

$$\frac{12(\sin 13)}{(\sin 67)} = \frac{x(\sin 67)}{(\sin 67)}$$

$$2.9325 = x$$

2.

[37]

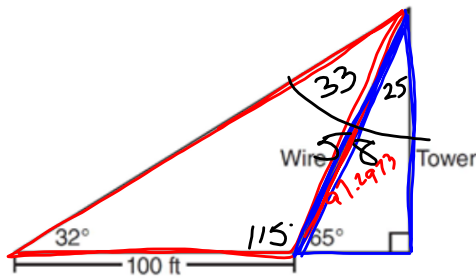35°

x 44mm

88°   57°

$$\frac{\sin 88}{44} = \frac{\sin 57}{x}$$

$$\frac{x(\sin 88)}{(\sin 88)} = \frac{44(\sin 57)}{\sin 88}$$

$$x = 36.923$$

3. The diagram below shows the plans for a cell phone tower. A guy wire attached to the top of the tower makes an angle of 65 degrees with the ground. From a point on the ground 100 feet from the end of the guy wire, the angle of elevation to the top of the tower is 32 degrees. Find the height of the tower, to the nearest foot.
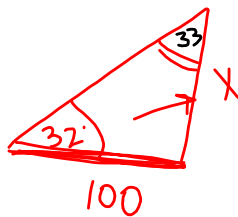
33   25

Wire   Tower

32°   115°   65°

100 ft

33

32°

100

x

97.2973...

65

y

$$\frac{\sin 32}{x} = \frac{\sin 33}{100}$$

$$\frac{x(\sin 33)}{(\sin 33)} = \frac{100(\sin 32)}{(\sin 33)}$$

$$x = 97.2973\ldots$$

$$\sin 65 = \frac{y}{97.2973}$$

$$y = 88.18\ldots$$

[88 ft]