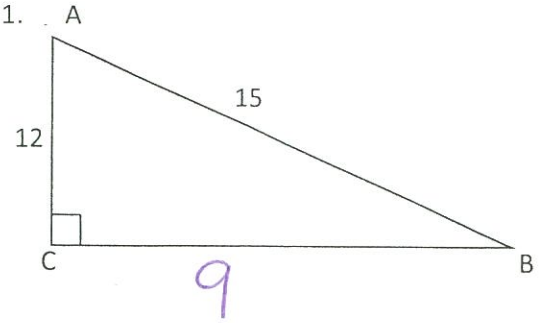
Right Triangle Trig: Additional Problems

Name Key

Find the value for the Trigonometric Ratios. Simplify (**do not calculate**!!) fractions where necessary.

1.

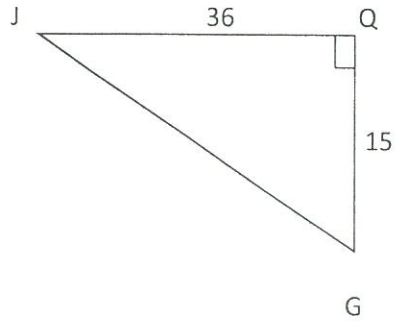


sin A = $9/15 = 3/5$ sin B = $4/5$

cos A = $12/15 = 4/5$ cos B = $3/5$

tan A = $3/4$ tan B = $4/3$

2.



Find the measures of angles J and G.

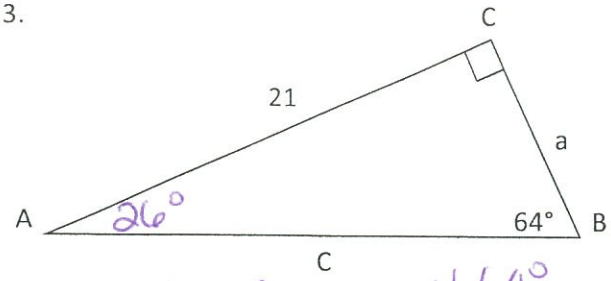
$m\angle J = \tan^{-1}\left(\frac{15}{36}\right) \approx 22.6^\circ$

$m\angle G = 90 - 22.6^\circ \approx$

m ∠J = 22.6° m ∠G = 67.4°

Solve for the missing side lengths (to the nearest hundredth) and angle measures (to the nearest tenth of a degree).

3.



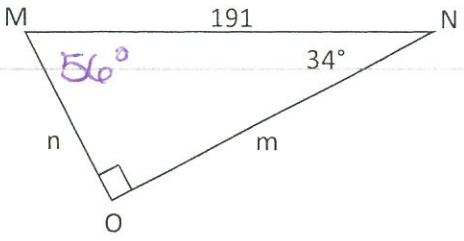
A = 26°

a = $21 \tan 26^\circ \approx 10.24$ ft

c = $\frac{21}{\sin 64^\circ} \approx 23.36$ ft

$\frac{\tan 26^\circ}{1} = \frac{a}{21}$ $\frac{\sin 64^\circ}{1} = \frac{21}{c}$

4.



M = 56°

m = $191 \cdot \sin 56^\circ = 158.35$ ft

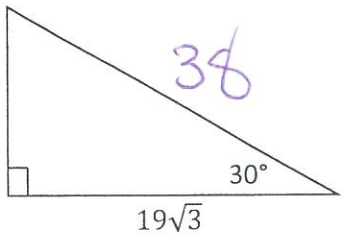
n = $191 \cdot \sin 34^\circ = 106.81$ ft

$\frac{\sin 56^\circ}{1} = \frac{m}{191}$

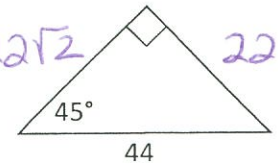
$\frac{\sin 34^\circ}{1} = \frac{n}{191}$

Find the missing side lengths. Leave your answers in **simplest radical form**.

5.

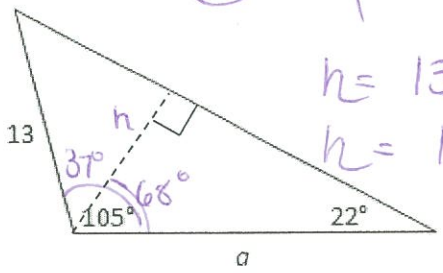


6.



$\frac{44}{\sqrt{2}} = 22\sqrt{2}$ $22\sqrt{2}$

6. Find the length of side *a*.



① $\frac{\cos 37^\circ}{1} = \frac{h}{13}$

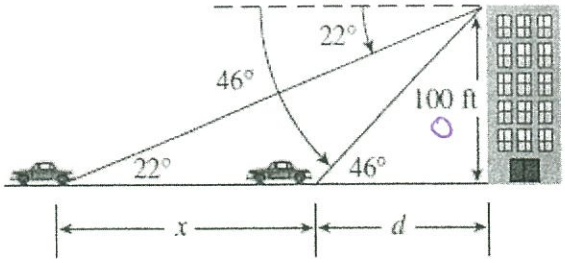
$h = 13 \cdot \cos 37^\circ$

$h = 10.38$

② $\frac{\sin 22^\circ}{1} = \frac{10.38}{a}$

$a = \frac{10.38}{\sin 22^\circ} \approx 27.7$

7. From the top of the 100-foot tall Altgelt Hall a man observes a car moving toward the building. If the angle of depression to the car changes from 22° to 46° during the observation, how far does the car travel?



$x + d$

$\frac{\tan 22^\circ}{1} = \frac{100}{(x+d)}$

$(x+d) = \frac{100}{\tan 22^\circ}$

$x + d = 247.509$ ft

$\frac{\tan 46^\circ}{1} = \frac{100}{d}$

$d = \frac{100}{\tan 46}$

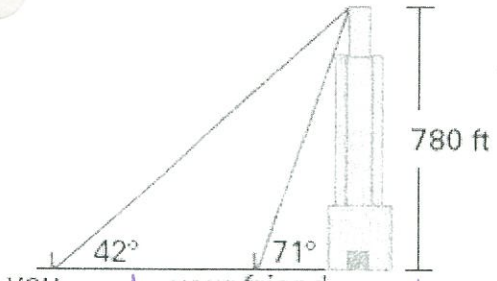
$d = 96.5689$

$x = (x+d) - d$

$x = 247.509 - 96.5689$

$x = 150.94$ ft

8. You are a block away from a skyscraper that is 780 feet tall. Your friend is between the skyscraper and yourself. The angle of elevation from your position to the top of the skyscraper is 42°. The angle of elevation from your friend's position to the top of the skyscraper is 71°. To the nearest foot, how far are you from your friend?



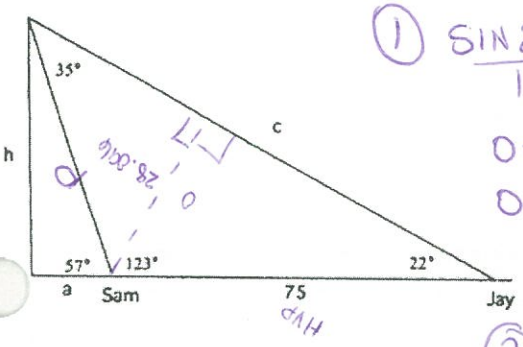
$\frac{\tan 42^\circ}{1} = \frac{780}{(x+d)}$ $\tan 71 = \frac{780}{x}$

$(x+d) = \frac{780}{\tan 42^\circ}$ $x = \frac{780}{\tan 71^\circ}$

$x + d = 866.278$ $x = 268.576$

$d = (x+d) - x = 597.702$

9. Jay and Sam are staring at the top of the hill. Jay and Sam are 75 feet apart. The angle of elevation to the top of the hill for Jay is 22° while the angle of elevation to the top of the hill for Jay is 22° while the angle of elevation to the top of the hill for Sam is 57°. Find the height of the hill.



① $\frac{\sin 22^\circ}{1} = \frac{o}{75}$ ② $\frac{\tan 35^\circ}{1} = \frac{28.096}{p}$

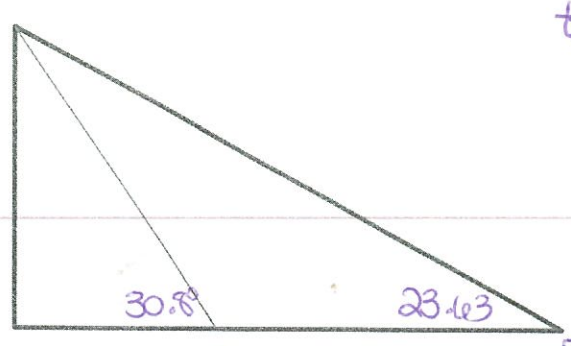
$o = 75 \cdot \sin 22$ $p = \frac{28.096}{\tan 35^\circ}$

$o = 28.096$ $p \approx 40.1245$

③ $\frac{\sin 57^\circ}{1} = \frac{h}{40.1245}$

$h = 40.125(\sin 57^\circ) \approx 33.6513$ ft

9. Bob is driving along a straight and level road straight toward a mountain. At some point on his trip he measures the angle of elevation to the top of the mountain and finds it to be 23.63°. He then drives 1 mile (1 mile = 5280 ft.) more and measures the angle of elevation to be 30.8° . Find the height of the mountain to the nearest foot. (***Hint draw a picture lime the one above***)



$\frac{\tan 23.63}{1} = \frac{m}{d}$ $\tan 30.8 = \frac{m}{x}$

$m = d \tan 23.63$ $m = x \tan 30.8$

$m = (x+5280)\tan 23.63^\circ$ $m = x \tan 30.8$

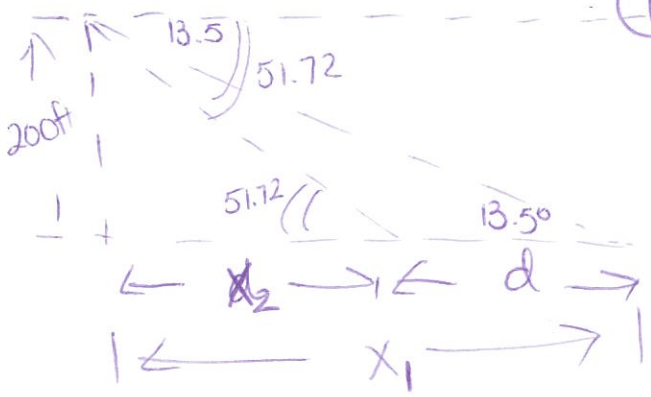
$m = .4375x + 2310.07$ $m = 0.59612x$

$.4375x + 2310.07 = 0.59612x$

$2310.07 = 0.158607x$

$x = \frac{2310.07}{0.158607} \approx 14,564.9$ ft

10. A person is watching a boat from the top of a lighthouse. The boat is approaching the lighthouse directly. When first noticed the angle of depression of the boat is 13.35°. When the boat stops, the angle of depression is 51.72°. The lighthouse is 200 feet tall. How far did the boat travel from when it was first noticed until it stopped? Round your answer to the nearest hundreth?



$d = X_1 - X_2$

① $\frac{\tan 13.5^\circ}{1} = \frac{200}{X_1}$

$X_1 = \frac{200}{\tan 13.5^\circ}$

$X_1 \approx 833.06\text{ft}$

② $\frac{\tan 51.72}{1} = \frac{200}{X_2}$

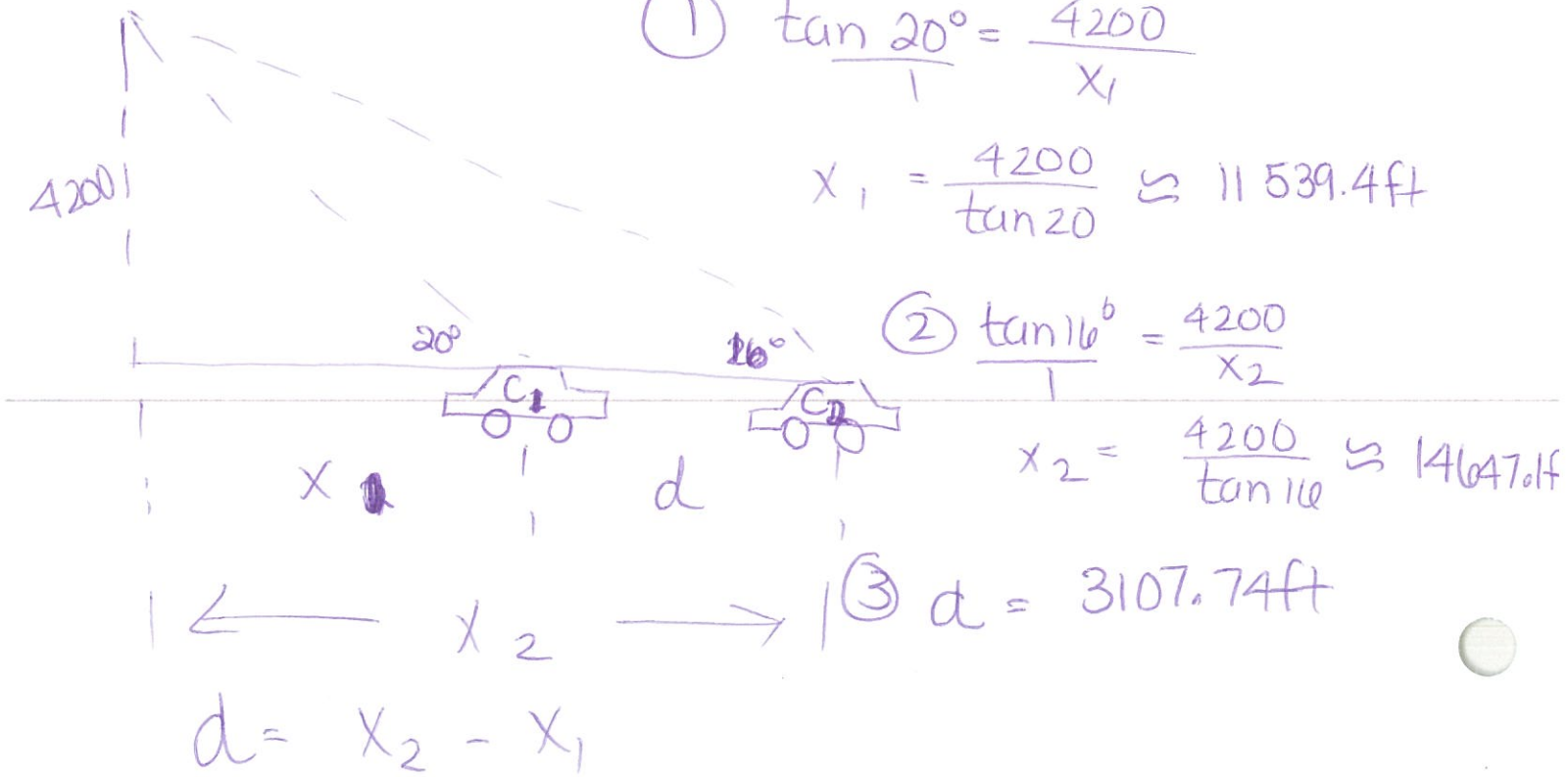
$X_2 = \frac{200}{\tan 51.72}$

$X_2 = 157.837$

③ $d = X_1 - X_2$

$d = 675.223$

11. A police helicopter is monitoring the speed of two cars on a straight road. The helicopter is at an altitude of 4200 feet directly above the road. At one instant, the angle if elevation from the first car to the helicopter is 20°, and the angle of elevation from the second car to helicopter is 20°, and the angle of elevation from the second car to the helicopter is 16°. How far apart are the two cars to the nearest foot?



$d = X_2 - X_1$

① $\frac{\tan 20^\circ}{1} = \frac{4200}{X_1}$

$X_1 = \frac{4200}{\tan 20} \approx 11539.4\text{ft}$

② $\frac{\tan 16^\circ}{1} = \frac{4200}{X_2}$

$X_2 = \frac{4200}{\tan 16} \approx 14647.1\text{ft}$

③ $d = 3107.74\text{ft}$