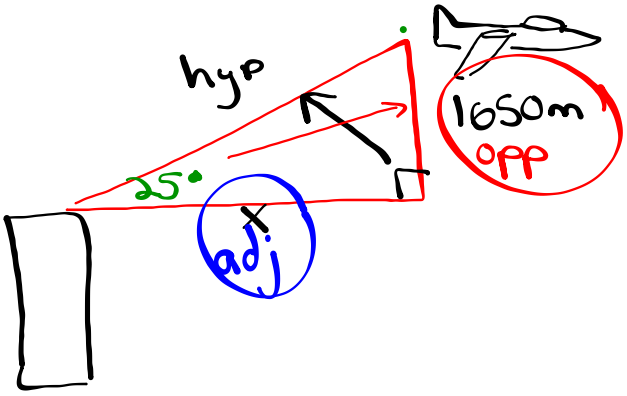
Warm Up Questions !!

#1 The angle of ~~depression~~ elevation from a plane in the air to the top of a tower is 25°. The altitude of the plane is 1650m higher than the top of the tower. What is the horizontal distance from the plane to the tower?



$\tan\theta = \frac{opp}{adj}$

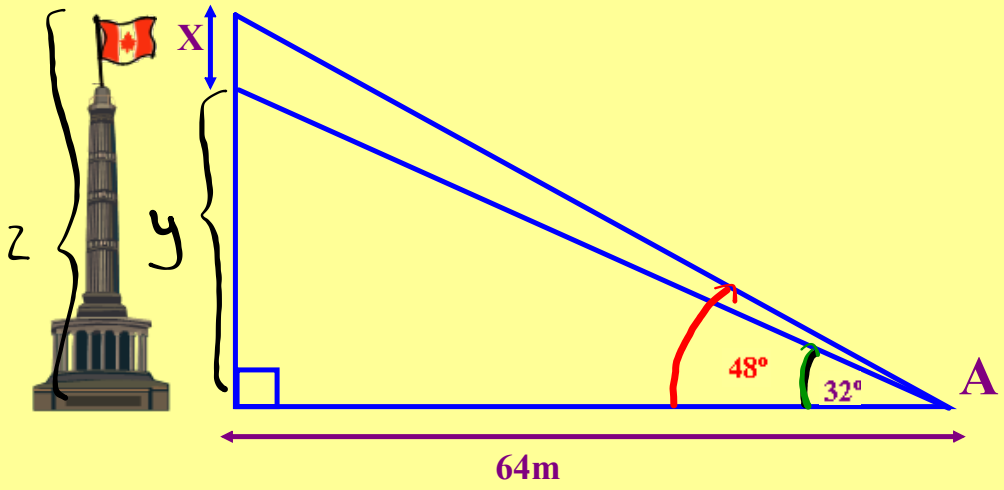
$\tan 25° = \frac{1650}{x}$

$x \cdot 0.4663 = \frac{1650}{x} \cdot x$

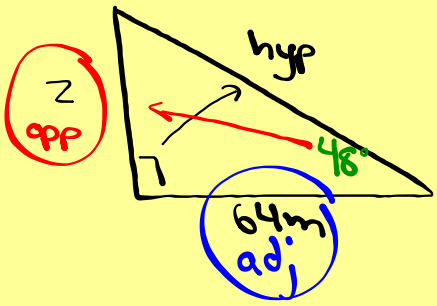
$\frac{0.4663x}{0.4663} = \frac{1650}{0.4663}$

$x = 3538.5\,m$

#2 The angle of elevation to the top of a building from point A is 32°. Point A is located 64.0m from the base of the building. A flagpole is on the top of the building. The angle of elevation from point A to the top of the flagpole is 48°. What is the length of the flagpole?



(i) Find z: (Big Δ)



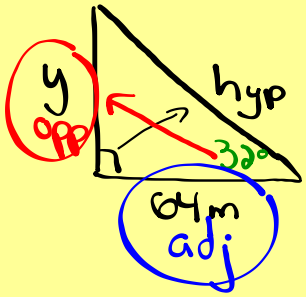
$\tan\theta = \frac{opp}{adj}$

$\tan 48° = \frac{z}{64}$

$64 \cdot 1.1106 = \frac{z}{64} \cdot 64$

$71.1m = z$

(ii) Find y: (Small Δ)



$\tan\theta = \frac{opp}{adj}$

$\tan 32° = \frac{y}{64}$

$64 \cdot 0.6249 = \frac{y}{64} \cdot 64$

$40m = y$

(iii) Find x:

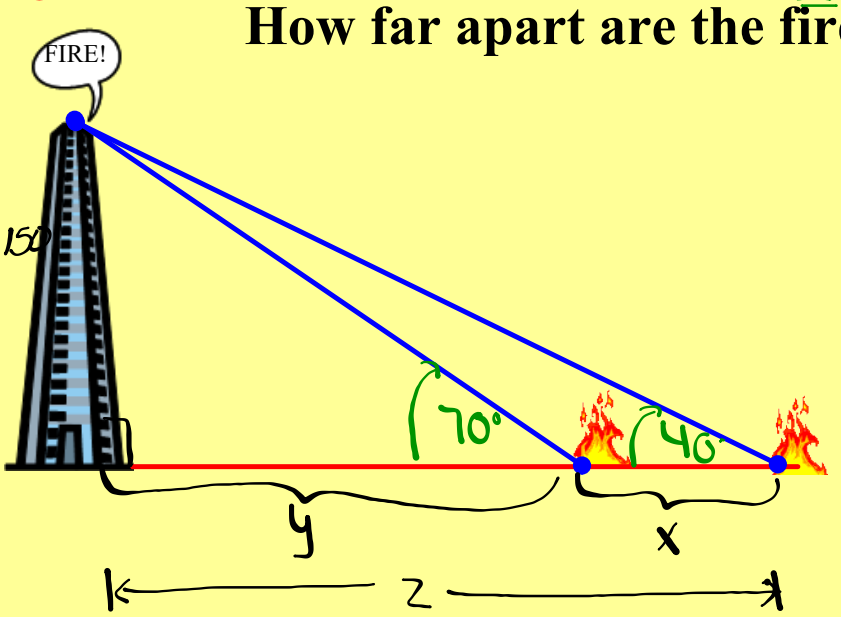
$x = z - y$

$x = 71.1 - 40$

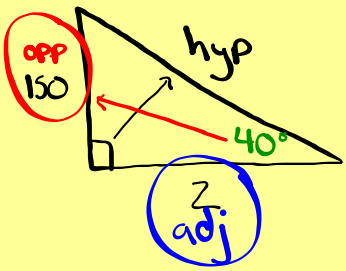
$x = 31.1m$

Exam Question

A forest ranger in a tower 150m high sights two fires in the same line of sight with the angles of ~~depression~~ elevation of 40 and 70 degrees. How far apart are the fires?



(i) Find z: (Big Δ)



$\tan\theta = \frac{opp}{adj}$

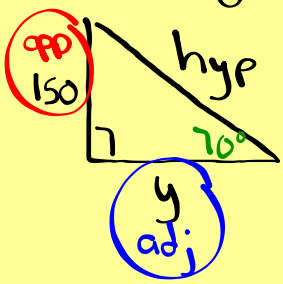
$\tan 40° = \frac{150}{z}$

$z \cdot 0.8391 = \frac{150}{z} \cdot z$

$\frac{0.8391z}{0.8391} = \frac{150}{0.8391}$

$z = 178.8m$

(ii) Find y: (Small Δ)



$\tan\theta = \frac{opp}{adj}$

$\tan 70° = \frac{150}{y}$

$y \cdot 2.7475 = \frac{150}{y} \cdot y$

$\frac{2.7475y}{2.7475} = \frac{150}{2.7475}$

$y = 54.6m$

(iii) Find x:

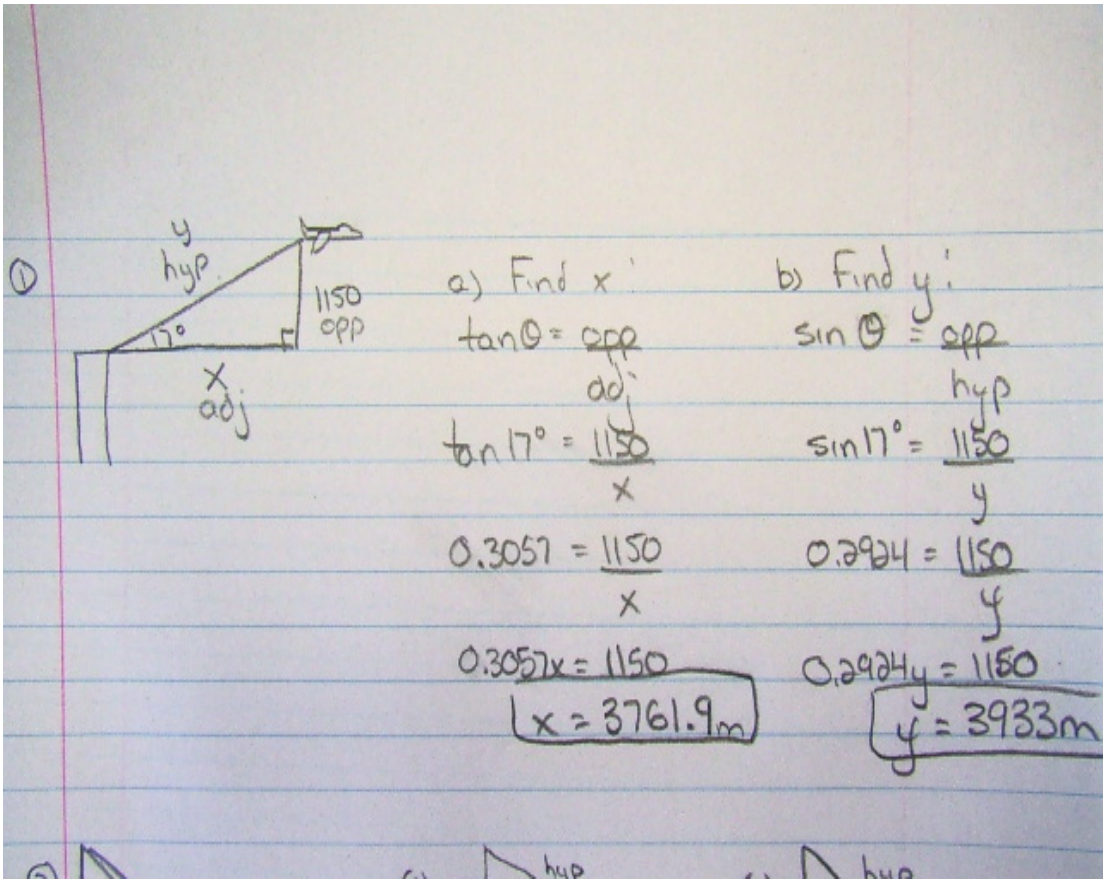
$x = z - y$

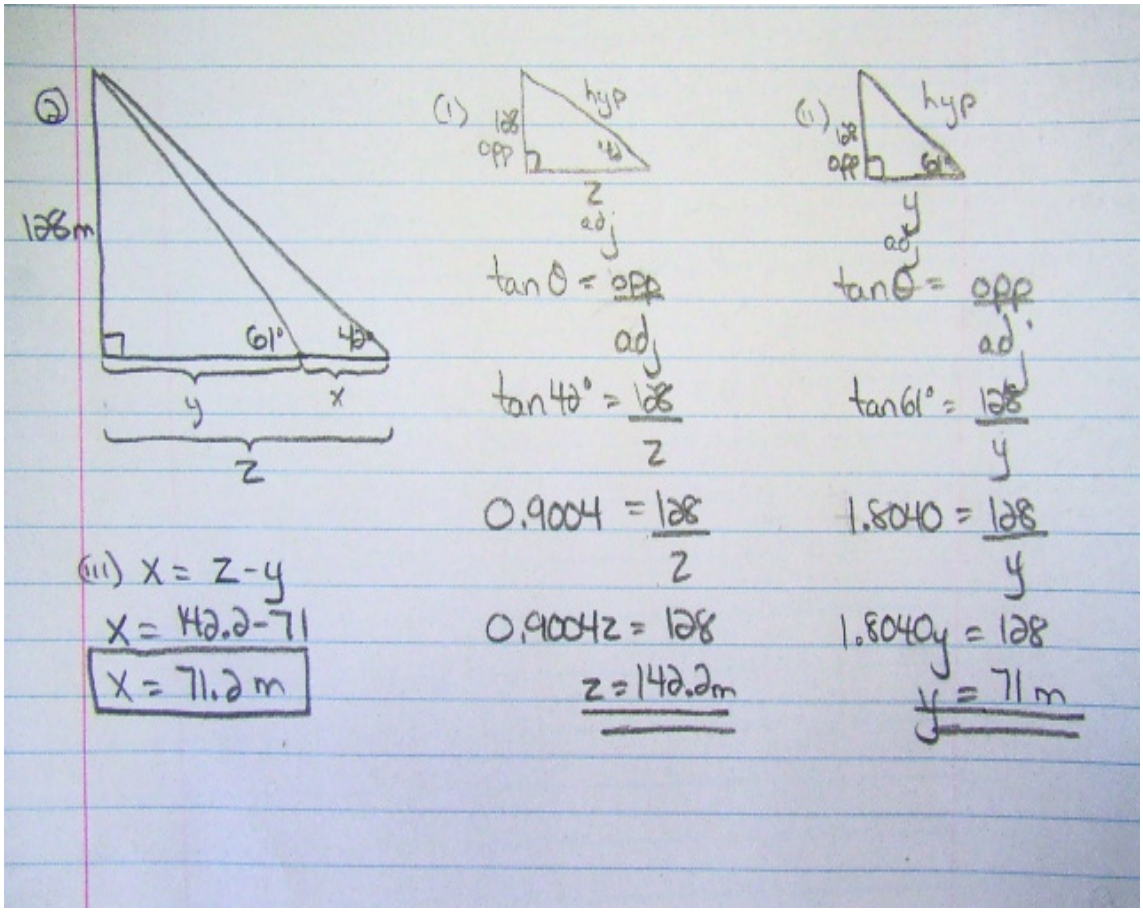
$x = 178.8 - 54.6$

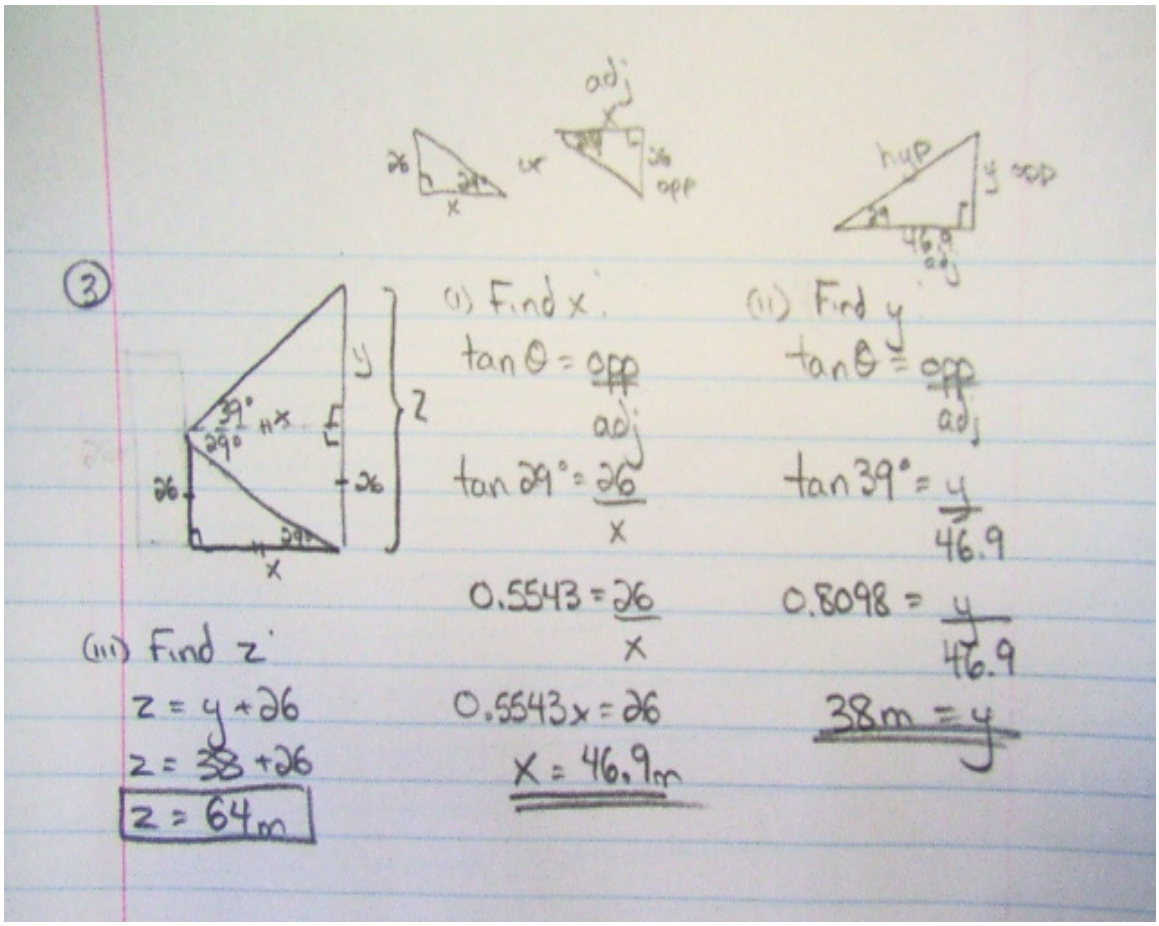
$x = 124.2m$

Homework

Solutions


①
y
hyp
17°
1150
opp
x
adj
a) Find x:
tanθ = opp/adj
tan17° = 1150/x
0.3057 = 1150/x
0.3057x = 1150
x = 3761.9m
b) Find y:
sinθ = opp/hyp
sin17° = 1150/y
0.2924 = 1150/y
0.2924y = 1150
y = 3933m


(2)
128m
61°
48°
y
x
z
(1)
hyp
128
opp
48°
z
adj
tan θ = opp/adj
tan 48° = 128/z
0.9004 = 128/z
0.9004z = 128
z = 142.2m
(1)
hyp
128
opp
61°
y
adj
tan θ = opp/adj
tan 61° = 128/y
1.8040 = 128/y
1.8040y = 128
y = 71m
(iii) X = Z - y
X = 142.2 - 71
X = 71.2 m



(3)

(i) Find x.

$\tan\theta = \frac{opp}{adj}$

$\tan 29° = \frac{26}{x}$

$0.5543 = \frac{26}{x}$

$0.5543x = 26$

$x = 46.9m$

(ii) Find y

$\tan\theta = \frac{opp}{adj}$

$\tan 39° = \frac{y}{46.9}$

$0.8098 = \frac{y}{46.9}$

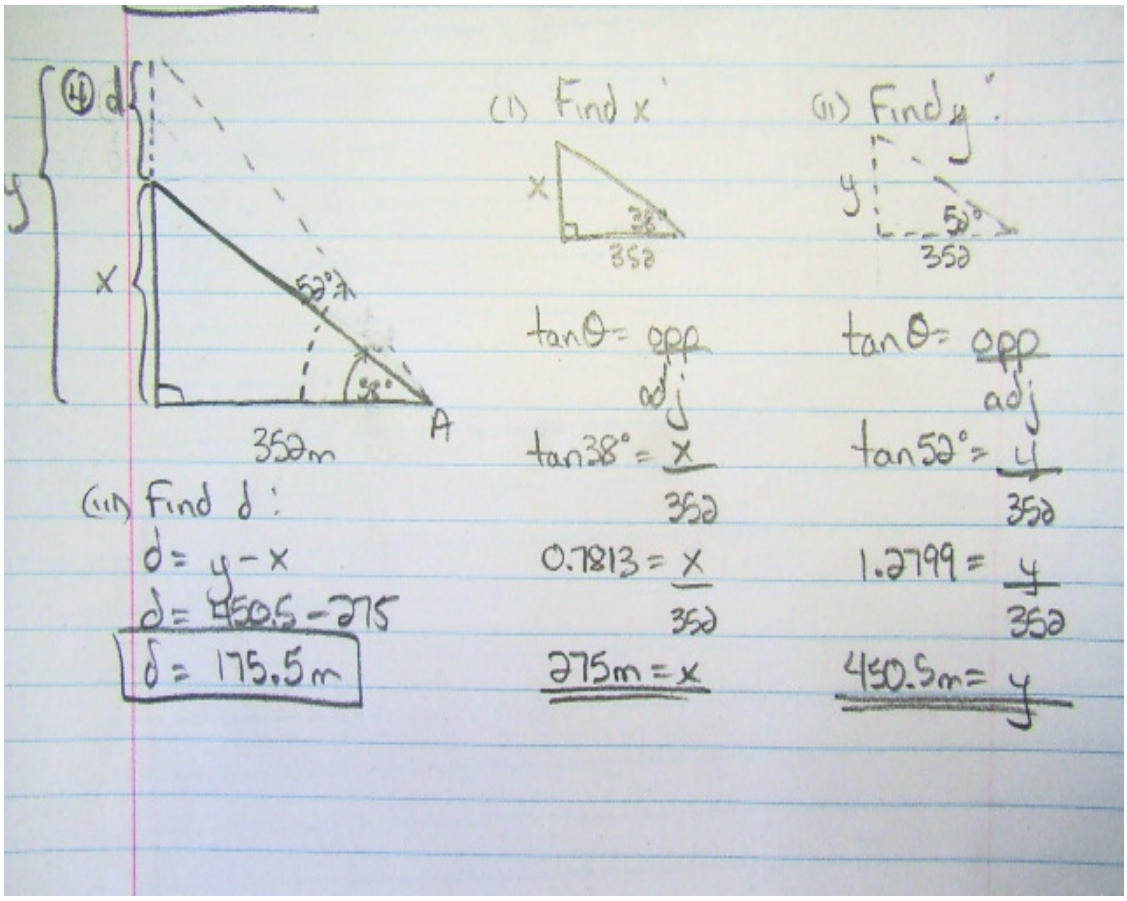
$38m = y$

(iii) Find z

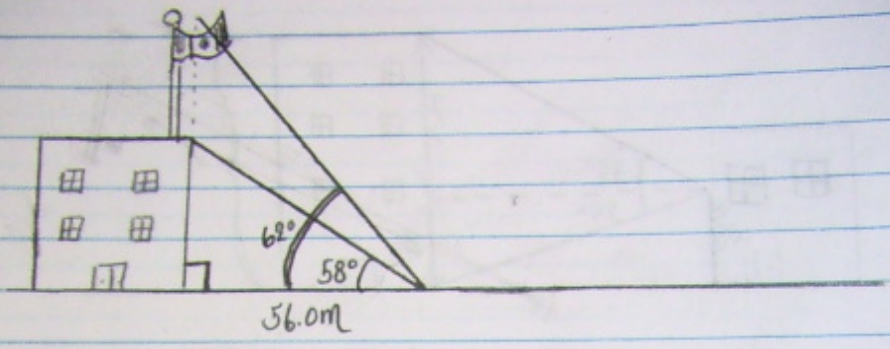
$z = y + 26$

$z = 38 + 26$

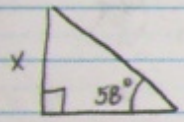
$z = 64m$


④ d
y
x
52°
38°
A
350m
(i) Find x:
x
38°
350
tanθ = opp/adj
tan38° = x/350
0.7813 = x/350
275m = x
(ii) Find y:
y
52°
350
tanθ = opp/adj
tan52° = y/350
1.2799 = y/350
450.5m = y
(iii) Find d:
d = y - x
d = 450.5 - 275
d = 175.5m

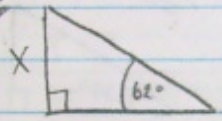
#5.



1st



2nd



3rd

105.3 m
89.6 m
15.7m

$\frac{\tan 58°}{1} = \frac{x}{56.0}$

$x = 89.6\text{ m}$

$\frac{\tan 62°}{1} = \frac{x}{56.0}$

$x = 105.3$

* The flagpole is 15.7m long.

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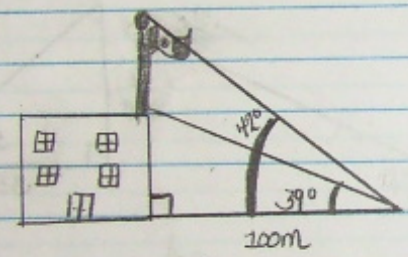
#6.

* The school is 80.9m high.
* The flagpole is 9.1m tall.



1st

opp
x
39°
100m
Adj

$\tan 39° = \frac{x}{100}$

$x = 80.9m$

2nd

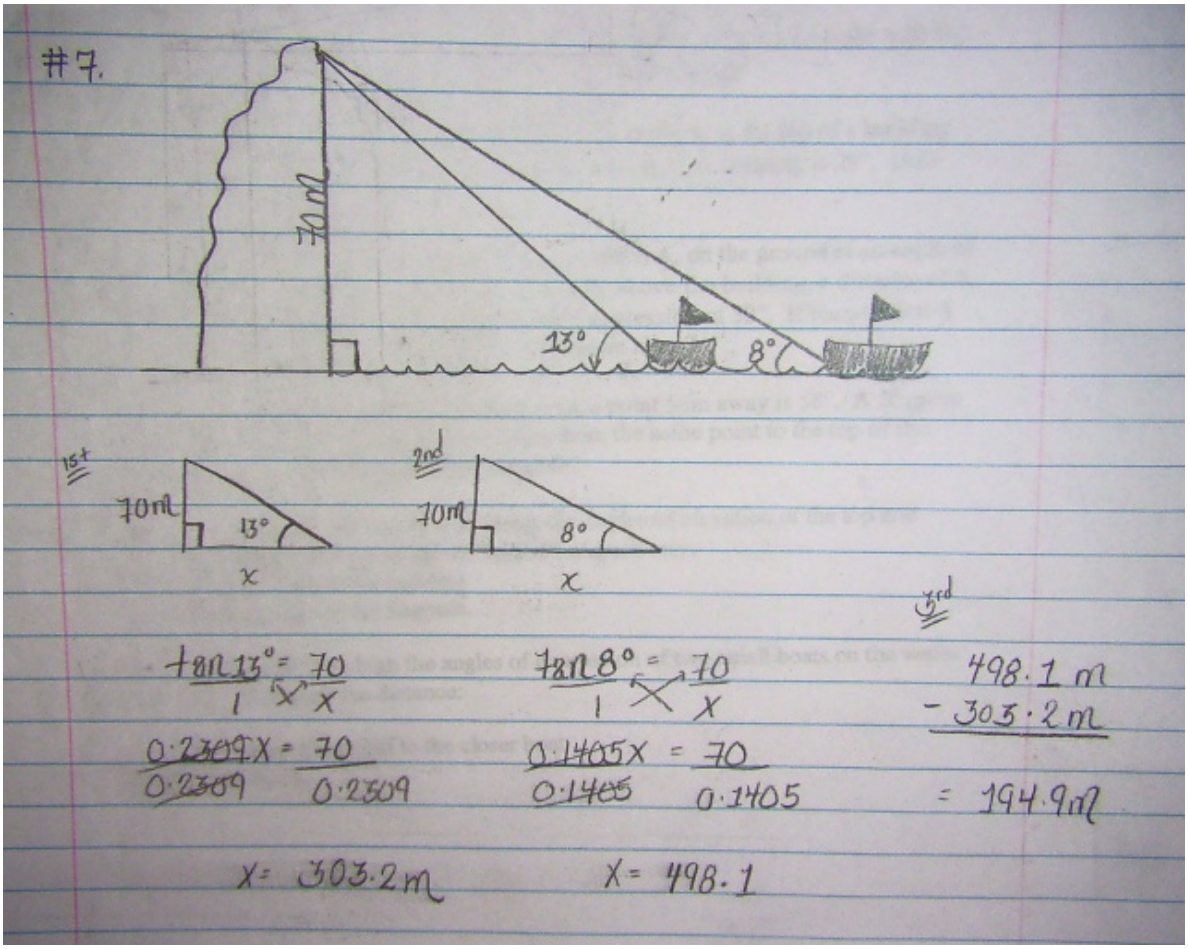
x
42°
100

$\tan 42° = \frac{x}{100}$

$x = 90.0m$

3rd

90.0m
− 80.9m
9.1m


#7.
70m
13°
8°
1st
70m
13°
x
2nd
70m
8°
x
tan 13° = 70/x
0.2309x = 70
0.2309 0.2309
x = 303.2m
tan 8° = 70/x
0.1405x = 70
0.1405 0.1405
x = 498.1
3rd
498.1 m
- 303.2 m
= 194.9m