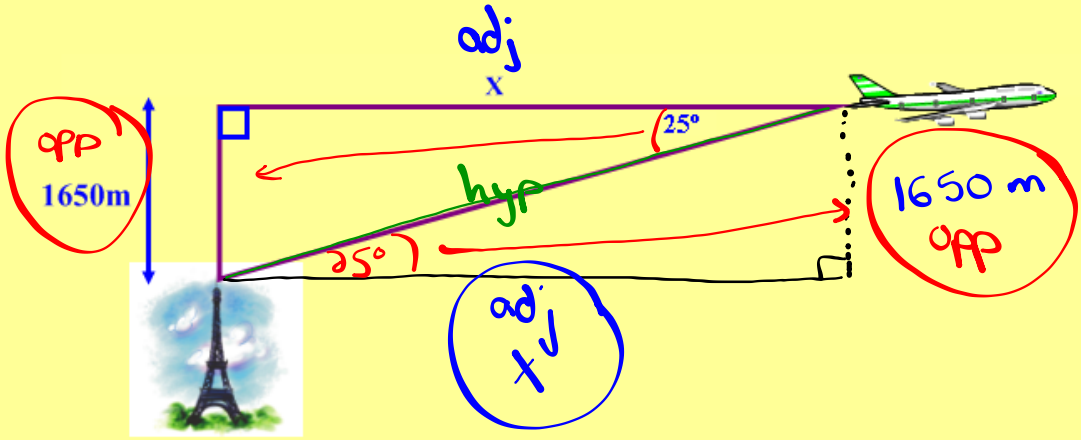
Warm Up Questions !!

height

#1 The angle of depression 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?



$$\tan\theta = \frac{o}{a}$$

$$\tan 25° = \frac{1650}{x}$$

$$\frac{0.4663}{1} = \frac{1650}{x}$$

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

$$0.4663x = 1650$$

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

$$x = 3538.5 \text{ m}$$

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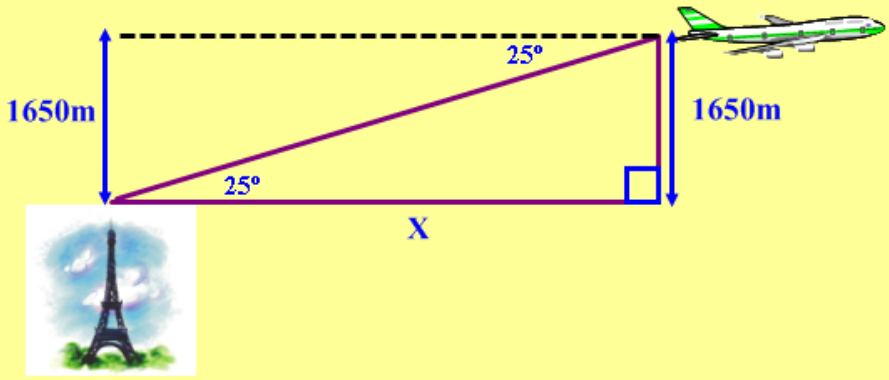
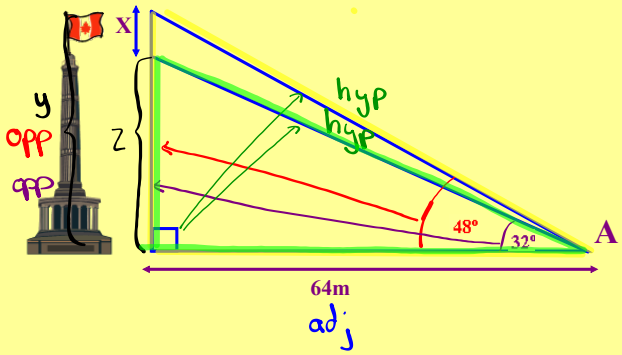


#2 The angle of elevation to the top of a building from point A is 32°. Point A is located 64.0m from the base of the building. A flagpole is on the top of the building. The angle of elevation from point A to the top of the flagpole is 48°. What is the length of the flagpole?



① Find distance from ground to top of flag (Big)

$\tan\theta = \frac{o}{a}$

$\tan 48° = \frac{y}{64}$

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

$71.1m = y$

② Find distance from ground to top of building (Small)

$\tan\theta = \frac{o}{a}$

$\tan 32° = \frac{z}{64}$

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

$40m = z$

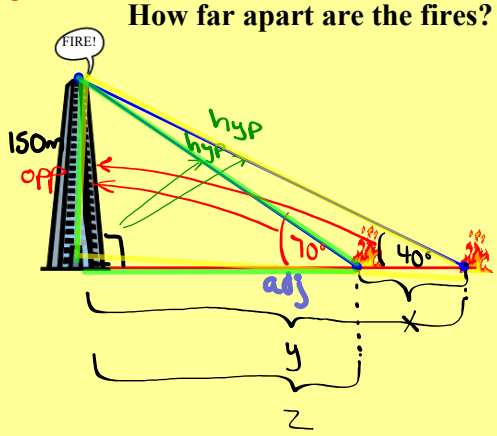
③ Find the height of the flagpole (x)

$x = y - z$

$x = 71.1 - 40$

$x = 31.1m$

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



① Find y: (Big Δ)

$\tan\theta = \frac{o}{a}$

$\tan 40° = \frac{150}{y}$

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

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

$y = 178.8m$

② Find z: (Small Δ)

$\tan\theta = \frac{o}{a}$

$\tan 70° = \frac{150}{z}$

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

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

$z = 54.6m$

③ Find x:

$x = y - z$

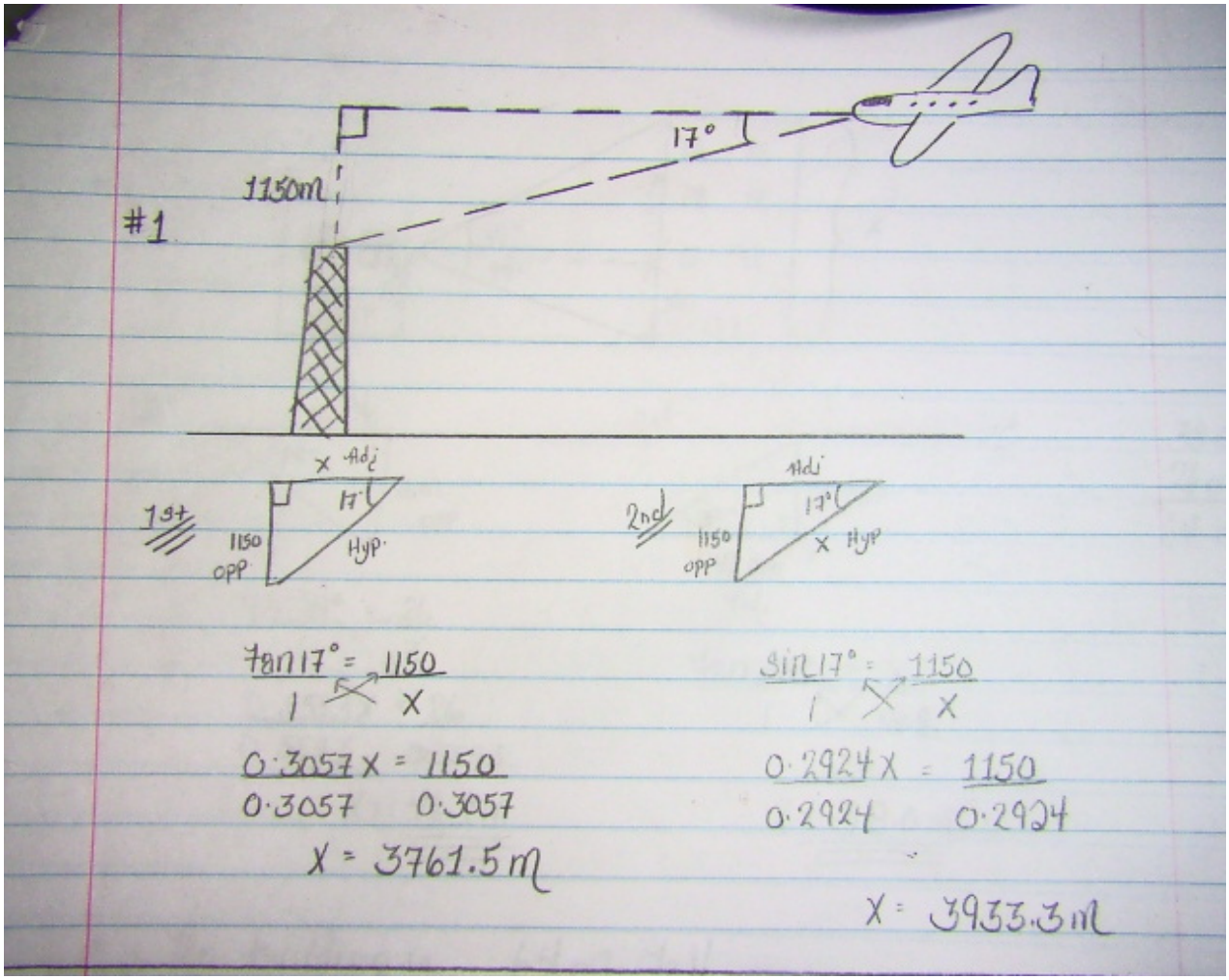
$x = 178.8 - 54.6$

$x = 124.2m$

Homework

1, 2, 5

Solutions


#1
1150m
17°
x Adj
17°
1150
opp
Hyp
Adj
17°
1150
opp
x Hyp
tan 17° = 1150 / x
0.3057x = 1150
0.3057 0.3057
x = 3761.5m
sin 17° = 1150 / x
0.2924x = 1150
0.2924 0.2924
x = 3933.3m

Solutions

$\tan 17° = \frac{1150}{x}$

$0.3057x = 1150$

$x = 3761.5\text{ m}$

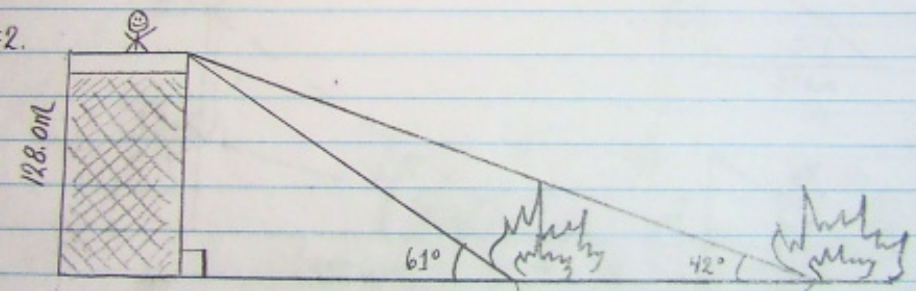
$\sin 17° = \frac{1150}{x}$

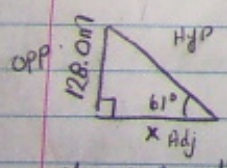
$0.2924x = 1150$

$x = 3933.3\text{ m}$

- The horizontal distance is 3761.5m.
- The distance btw. the plane and the tower 3933.3m.

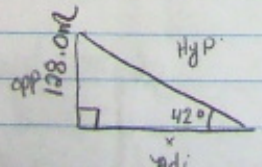
#2.





$\tan 61° = \frac{128}{x}$

$x = 70.1\text{ m}$



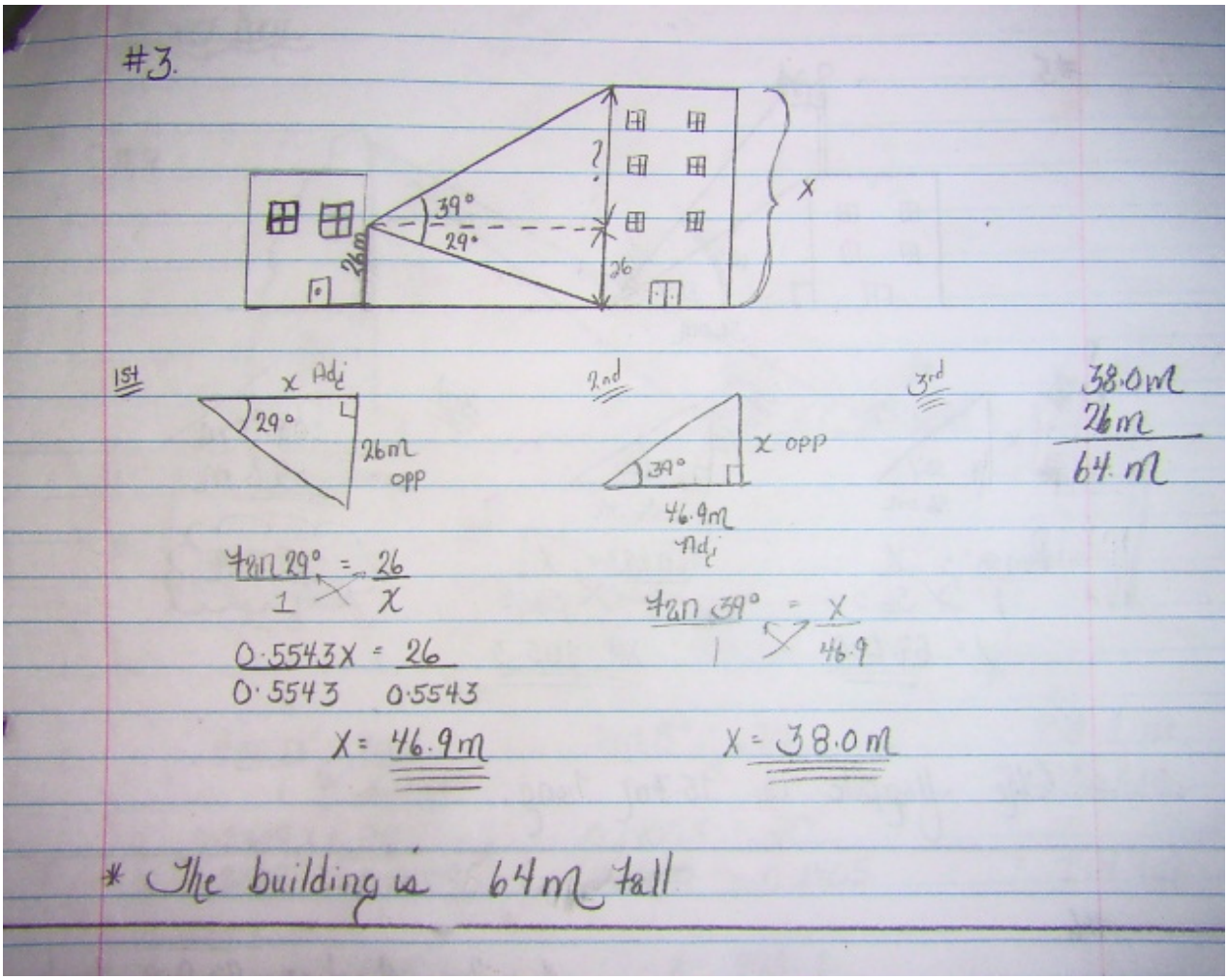
$\tan 42° = \frac{128}{x}$

$x = 142\text{m}$

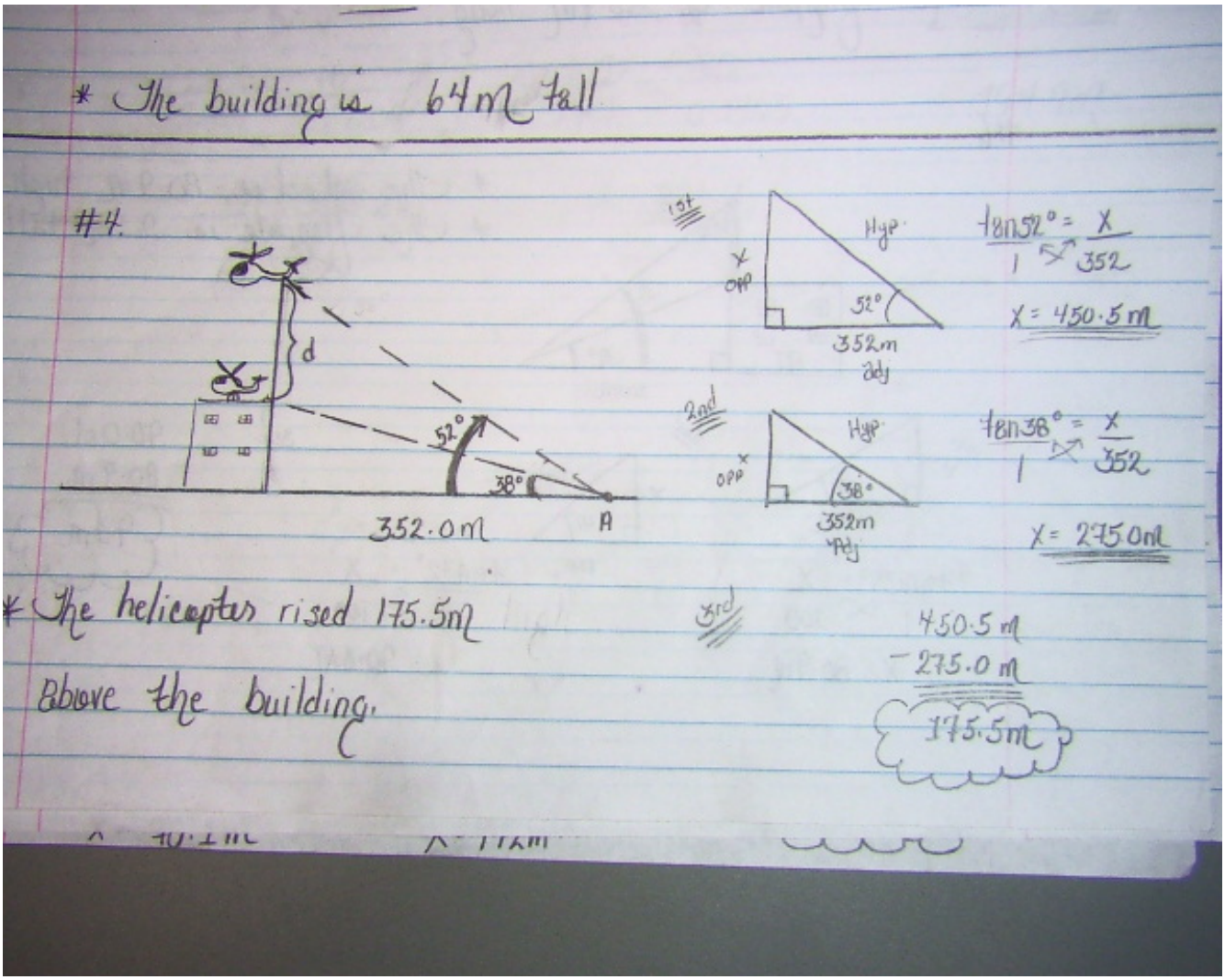
* The distance btw. the fires is 72.1m

142.2 m
− 70.1 m
= 72.1m

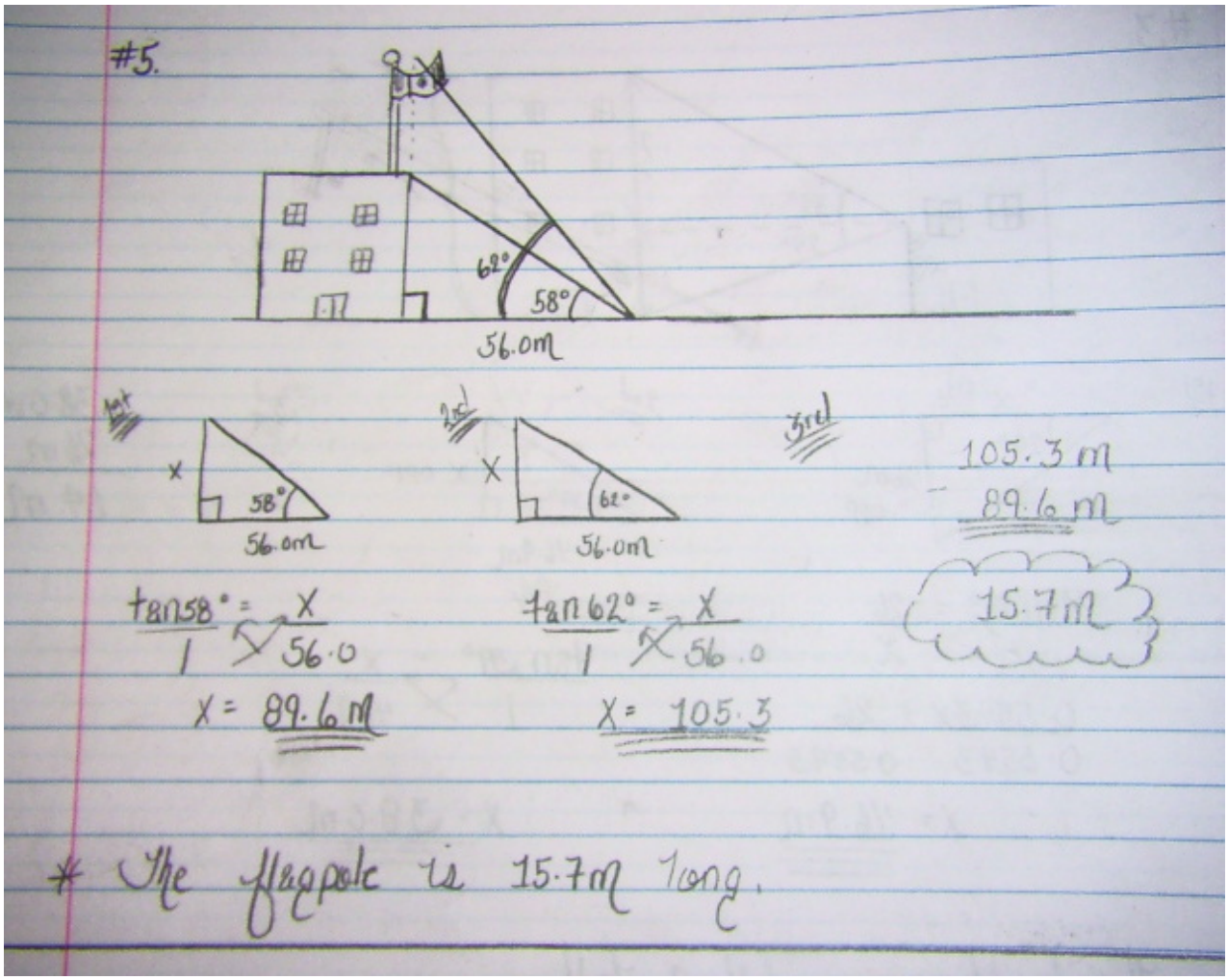
Solutions


#3.
?
X
39°
29°
26m
26
1st
X Adj
29°
26m
OPP
tan 29° = 26/X
0.5543X = 26
0.5543 0.5543
X = 46.9m
2nd
X OPP
39°
46.9m
Adj
tan 39° = X/46.9
X = 38.0m
3rd
38.0m
26m
64m
* The building is 64m tall

Solutions


* The building is 64m tall
#4.
d
52°
38°
352.0m
A
1st
Hyp
X
OPP
52°
352m
Adj
tan52° = X/352
X = 450.5m
2nd
Hyp
X
OPP
38°
352m
Adj
tan38° = X/352
X = 275.0m
* The helicopter rised 175.5m above the building.
3rd
450.5m
- 275.0m
175.5m

Solutions

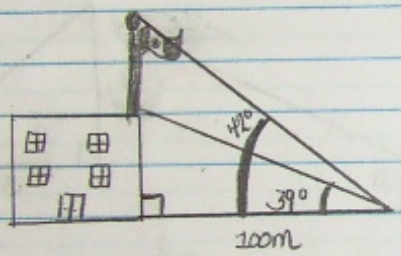

#5.
62°
58°
56.0m
1st
x
58°
56.0m
2nd
x
62°
56.0m
3rd
105.3 m
89.6 m
15.7m
tan58° = x/56.0
X = 89.6 m
tan62° = x/56.0
X = 105.3
* The flagpole is 15.7m long.

Solutions

$X = 89.6\text{ m}$ $X = 105.3$

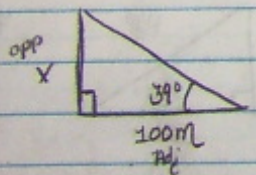
* The flagpole is 15.7m long.

#6.



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

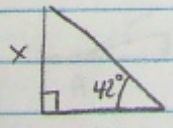
1st



$\tan 39° = \frac{X}{100}$

$X = 80.9\text{m}$

2nd



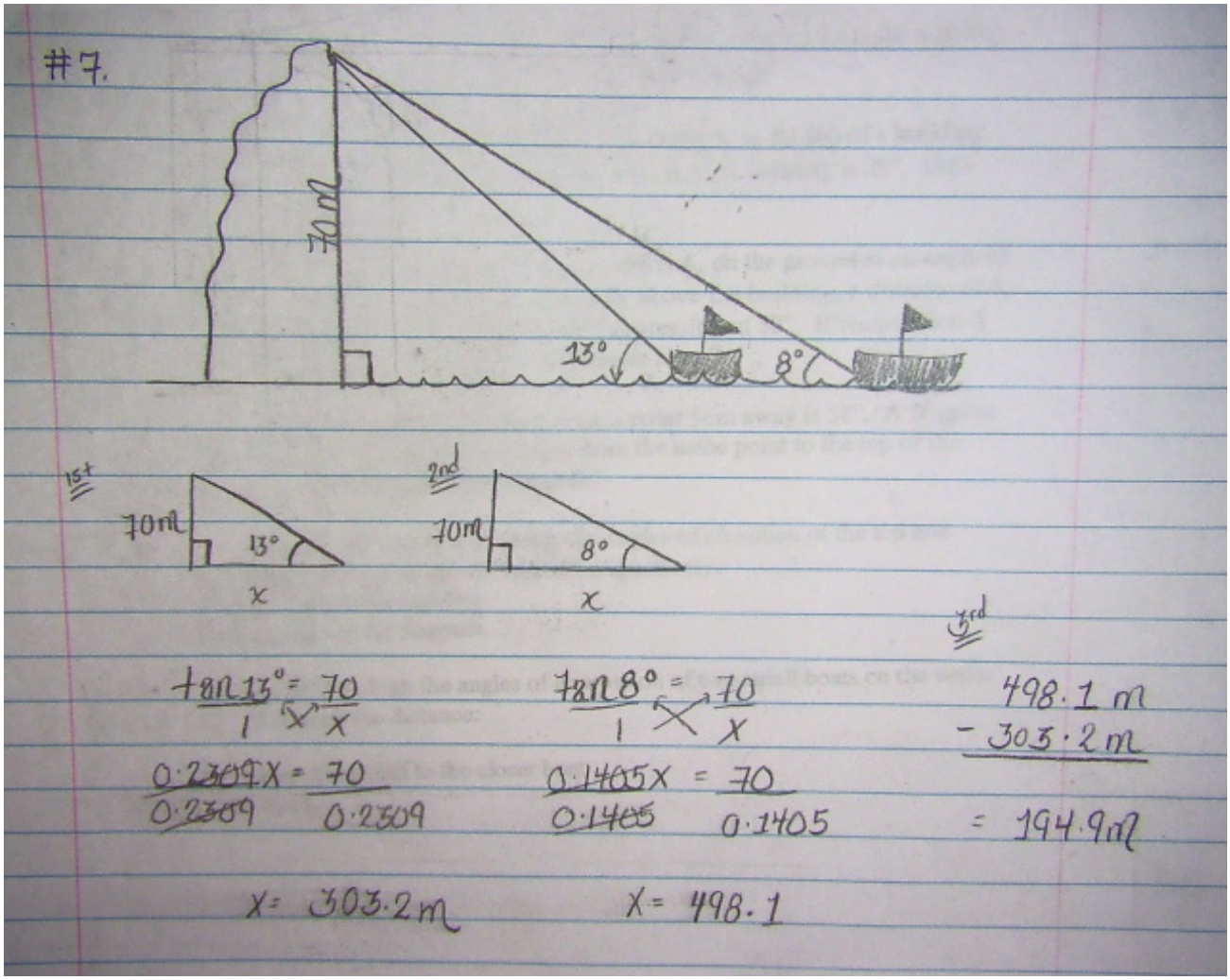
$\tan 42° = \frac{X}{100}$

$X = 90.0\text{m}$

3rd

$90.0\text{m} - 80.9\text{m} = 9.1\text{m}$

Solutions


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