

Warm Up

1. Jim is on a hill looking at a tower 350 ft away. The angle of elevation to the top is 28° and the angle of depression to the bottom is 10° . How tall is the tower?

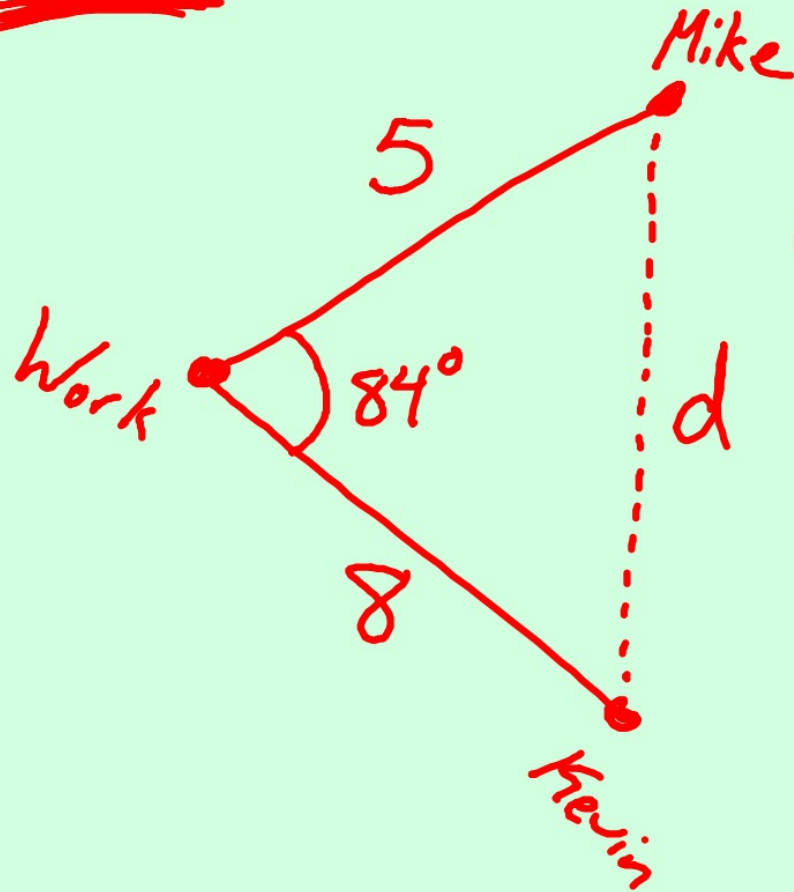
TANGENT

$$350 \tan 28 + 350 \tan 10$$

247.8 ft.

Warm Up

2. Mike and Kevin both drive from work. Mike drives 5 miles, Kevin drives 8 miles and the angle between their routes is 84° . How far apart are they?



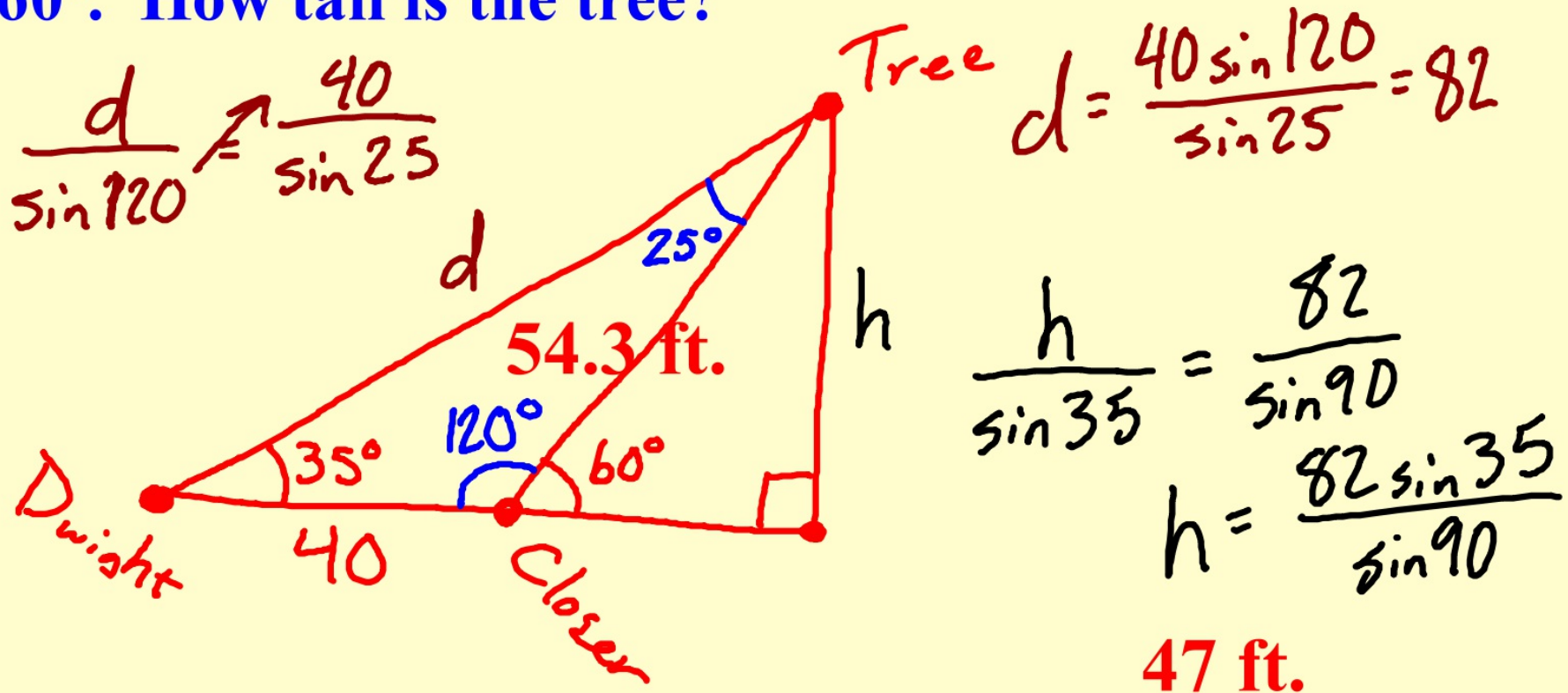
$$d^2 = 5^2 + 8^2 - 2(5)(8)\cos 84$$

$$\sqrt{\text{Ans}}$$

9 miles

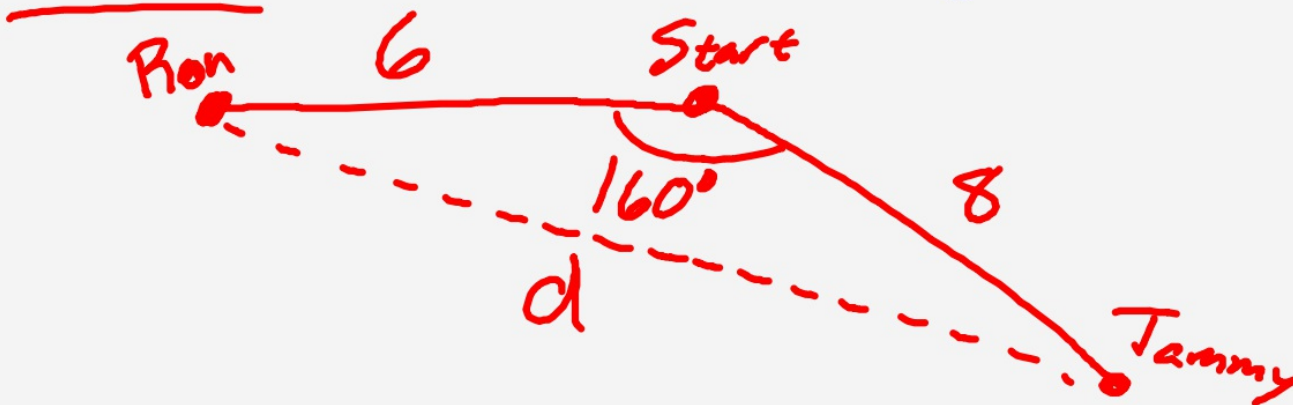
Warm Up

3. Dwight wonders how tall a tree is. He measures the angle of elevation to be 35° , he walks 40 feet closer and remeasures the angle of elevation to be 60° . How tall is the tree?



Warm Up

4. Ron heads west for 6 miles. Tammy leaves from the same point and travels 8 miles. The angle between them is 160° . How apart are they?



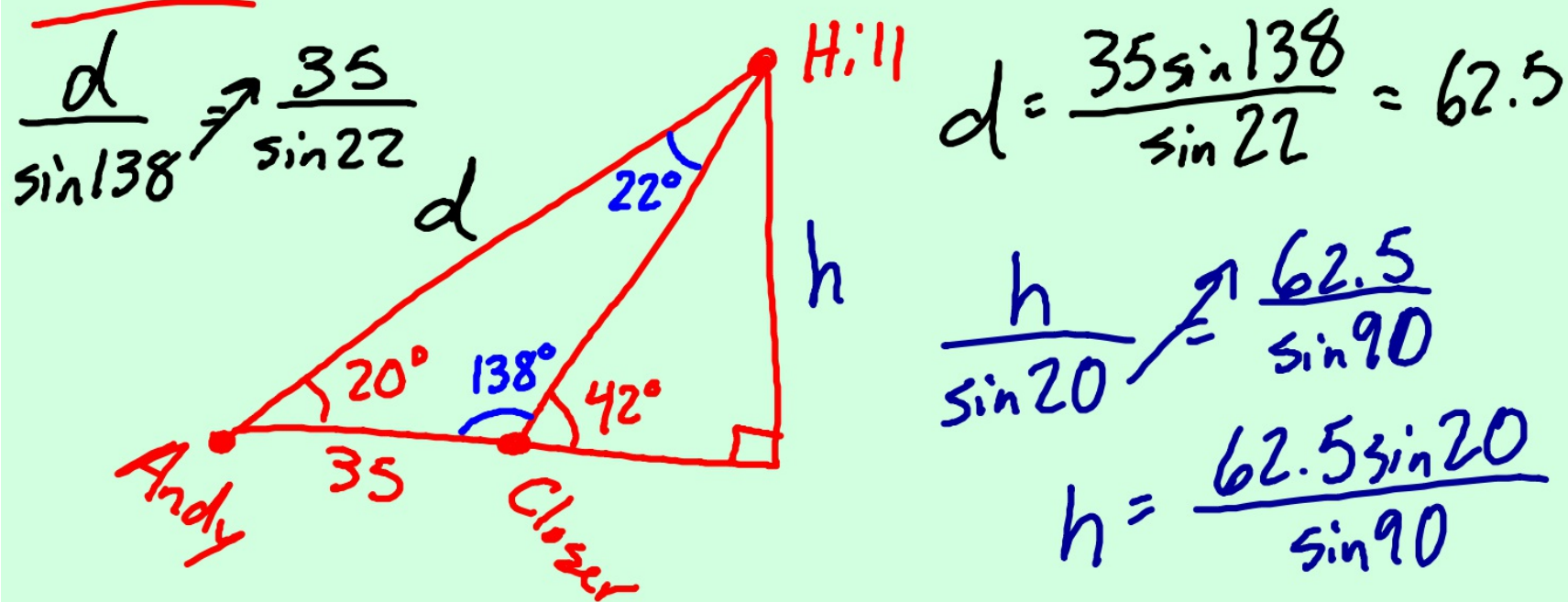
$$d^2 = 6^2 + 8^2 - 2(6)(8)\cos 160$$

$\sqrt{\text{Ans}}$

13.8

Warm Up

5. Andy wants to know how tall a hill is by his house. He measures the angle of elevation to be 20° , he walks 35 feet closer and remeasures the angle of elevation to be 42° . How tall is the hill?



21.4

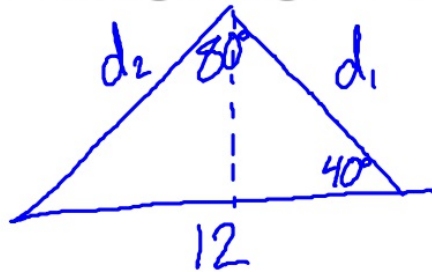
Warm Up

6. Chris looks out of his window and measures an angle of elevation of 25° to the top of a building and the angle of depression to the bottom is 32° . How tall is the other building if it is 400 ft away?

TANGENT

$$400 \tan 25 + 400 \tan 32 = 436.5$$

1. A post is supported by two wires (going in opposite directions from the top) creating an angle of 80° between the wires. The ends of the wires are 12 m apart on the ground with one wire forming an angle of 40° with the ground. Find the lengths of the wires.



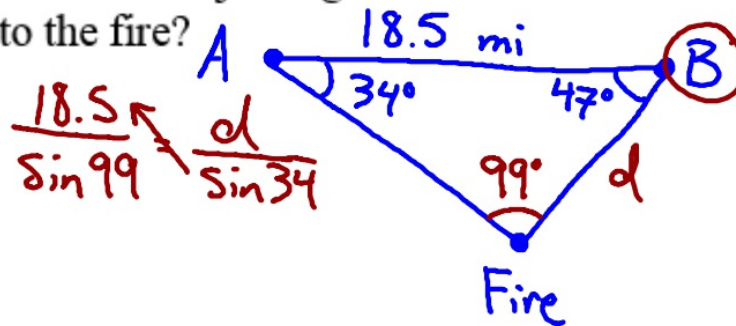
$$\frac{d_1}{\sin 40} = \frac{12}{\sin 80}$$

$$\boxed{7.8 \text{ m}}$$

$$\frac{d_2}{\sin 60} = \frac{12}{\sin 80}$$

$$\boxed{10.6 \text{ m}}$$

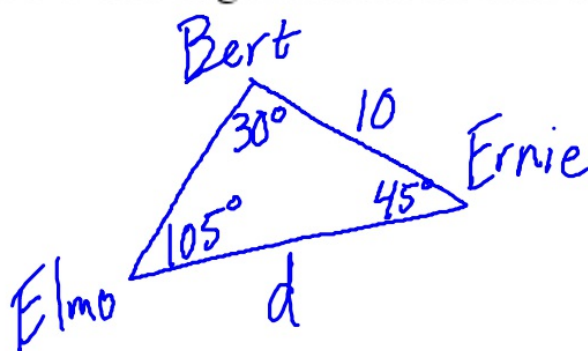
2. Two fire towers are built 18.5 miles apart. A fire is spotted at a 34° from Tower A and a 47° from tower B, both angles referenced from the line joining the two towers. Which tower is closer to the fire? And, what is its distance to the fire?



$$\frac{18.5}{\sin 99} = \frac{d}{\sin 34}$$

$$\boxed{d = 10.5 \text{ mi}}$$

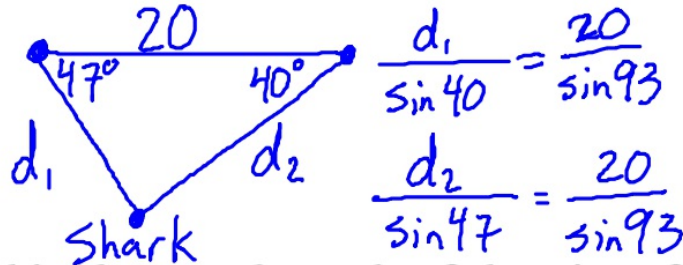
3. Three friends are camping in the woods; Bert, Ernie and Elmo. They each have their own tent and the tents are set up in a triangle. Bert and Ernie are 10 m apart. The angle formed at Bert is 30° . The angle formed at Elmo is 105° . How far apart are Ernie and Elmo?



$$\frac{10}{\sin 105} = \frac{d}{\sin 30}$$

$$\boxed{5.2 \text{ m}}$$

4. Two scuba divers are 20 m apart below the surface of the water. They both spot a shark that is below them. The angle of depression from diver 1 to the shark is 47° and the angle of depression from diver 2 to the shark is 40° . How far are each of the divers from the shark?



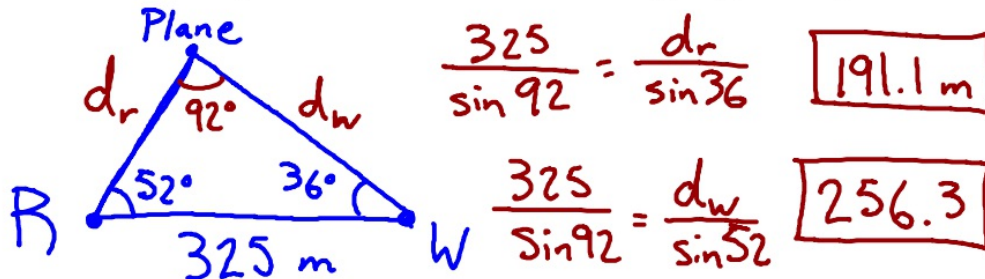
$$\frac{d_1}{\sin 40} = \frac{20}{\sin 93}$$

$$\frac{d_2}{\sin 47} = \frac{20}{\sin 93}$$

12.9 m

14.7 m

5. Richie observes the angle of elevation of an ultra-light plane to be 52° . At the same instant, the angle of elevation for Wesson is 36° . Richie and Wesson are 325m apart on level ground. How far is each person from the ultra-light plane (not on the same side)?



$$\frac{325}{\sin 92} = \frac{d_r}{\sin 36} \quad \boxed{191.1 \text{ m}}$$

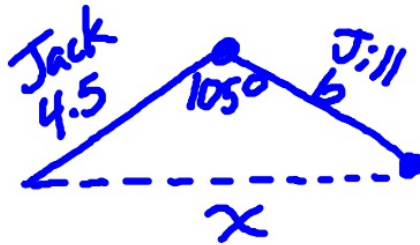
$$\frac{325}{\sin 92} = \frac{d_w}{\sin 52} \quad \boxed{256.3}$$

6. Helen is standing on a pier looking at her hotel. The angle of elevation to the top is 56° , the angle of depression to the bottom is 10° and the hotel is 500 feet away. How tall is her hotel?

$$500 \tan(56) + 500 \tan(10)$$

829.4 feet

7. Jack and Jill both start at point A. They each walk in a straight line at an angle of 105° to each other. After 45 minutes Jack has walked 4.5 km and Jill has walked 6 km. How far apart are they?

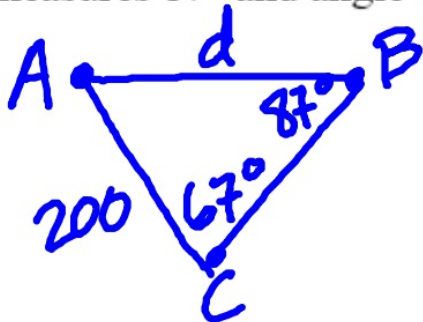


$$x^2 = 6^2 + 4.5^2 - 2(6)(4.5)\cos 105$$

$\sqrt{\text{Ans}}$

7.4 km

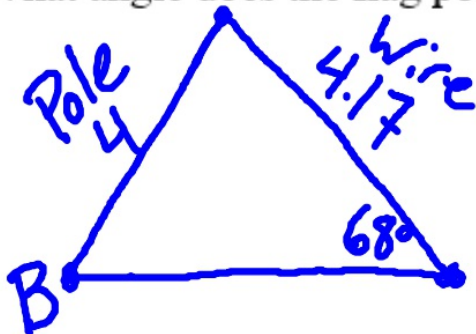
8. Points A and B are on opposite sides of the Grand Canyon. Point C is 200 yards from A. Angle B measures 87° and angle C measures 67° . What is the distance between A and B?



$$\frac{d}{\sin 67} = \frac{200}{\sin 87}$$

184.4 yds

9. A 4 m flag pole is not standing up straight. There is a wire attached to the top of the pole and anchored in the ground. The wire is 4.17 m long. The wire makes a 68° angle with the ground. What angle does the flag pole make with the wire?



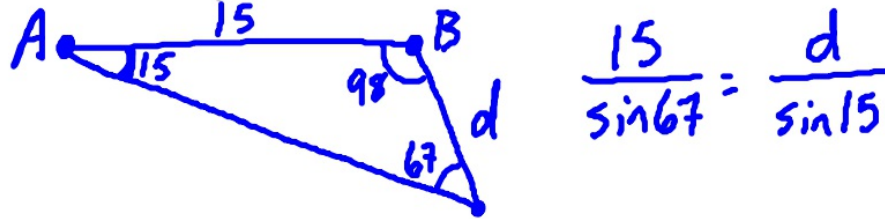
37°

$$180 - 68 - 75 = \text{ } \rightarrow$$

$$\frac{\sin B}{4.17} = \frac{\sin 68}{4}$$

$$\sin^{-1}\left(\frac{4.17 \sin 68}{4}\right) = 75$$

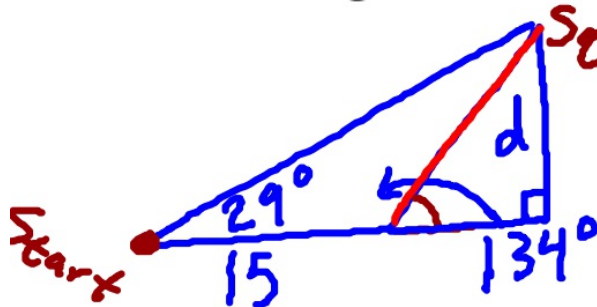
10. Two fire towers are built 15 miles apart. A fire is spotted at a 15° from Tower A and a 98° from tower B, both angles referenced from the line joining the two towers. Which tower is closer to the fire? And, what is its distance to the fire?



$$\frac{15}{\sin 67} = \frac{d}{\sin 15}$$

4.2 miles
B

11. Jimmy observes the angle of elevation to a squirrel in a tree to be 29° . When he walked 15 ft. closer the angle of elevation changed to 46° . How high is the squirrel in the tree?



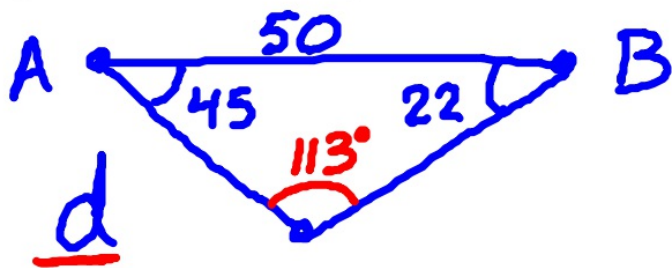
$$\frac{15}{\sin 17} = \frac{d}{\sin 29}$$

24.9 ft.

$$\frac{h}{\sin 29} = \frac{24.9}{\sin 90}$$

h = 12.1 ft

12. Two mortar operators are located 50 meters apart. An enemy bunker is spotted at a 45° from Alpha and a 22° from Bravo, both angles referenced from the line joining the two operators. Which operator is closer to the bunker? And, what is the distance to the bunker?



$$\frac{50}{\sin 113} = \frac{d}{\sin 22}$$

20.3
m.

10 Multiple Choice

What is $7 + 7 = ?$

XIV

1110

16

E

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
XIII
XIV

1
10
11
100
101
110
111
1000
1001
1010
1011
1100
1101
1110

1
2
3
4
5
6
7
10
11
12
13
14
15
16

1
2
3
4
5
6
7
8
9
A
B
C
D
E

Assignment::

WB 306 All

E.C. for 307