

Advanced Algebra

~~Chapter 8~~ ^{Chapter 9} Vectors and Bearings

Assignment # 13

- 1) A plane is traveling at 312mph with a bearing of 32. There is a 25mph wind blowing from the south. What is the final bearing and the ground speed of the plane?
- 2) A plane is traveling at 418mph with a bearing of 240. There is a 32mph wind blowing from the north. What is the final bearing and the ground speed of the plane?
- 3) A plane is traveling at 512mph with a bearing of 320. There is a 45mph wind blowing from the south. What is the final bearing and the ground speed of the plane?
- 4) A plane is traveling at 500mph with a bearing of 130. There is a 52mph wind blowing from the north. What is the final bearing and the ground speed of the plane?

Alternate Interior Angles are Congruent

Law of Cosines

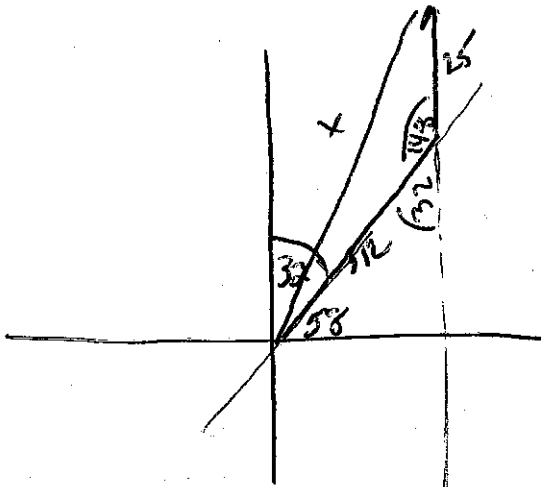
Law of Sines

- 5) A plane is traveling at 312mph with a bearing of 230. There is a 20mph wind blowing from the East. What is the final bearing and the ground speed of the plane?
- 6) A plane is traveling at 450mph with a bearing of 300. There is a 25mph wind blowing from the North. What is the final bearing and the ground speed of the plane?
- 7) A plane is traveling at 300mph with a bearing of 240. There is a 45mph wind blowing from the North. What is the final bearing and the ground speed of the plane?
- 8) A plane is traveling at 416mph with a bearing of 30. There is a 23mph wind blowing from the North. What is the final bearing and the ground speed of the plane?
- 9) A plane is traveling at 418mph with a bearing of 240. There is a 32mph wind blowing from the south. What is the final bearing and the ground speed of the plane?
- 10)

- 11) A plane is traveling at 210mph with a bearing of 40. There is a 32mph wind blowing from the Northwest (45). What is the final bearing and the ground speed of the plane?
- 12)

Assignment #13

①



$$x^2 = 312^2 + 25^2 - 2(312)(25)\cos 148$$

$$x = 333 \text{ m/hour}$$

$$\frac{\sin \theta}{25} = \frac{\sin 148}{333}$$

$$\theta = 2.3$$

$$32 - 2.3$$

$$29.7^\circ \text{ Bearing @ } 333 \text{ m/hour}$$

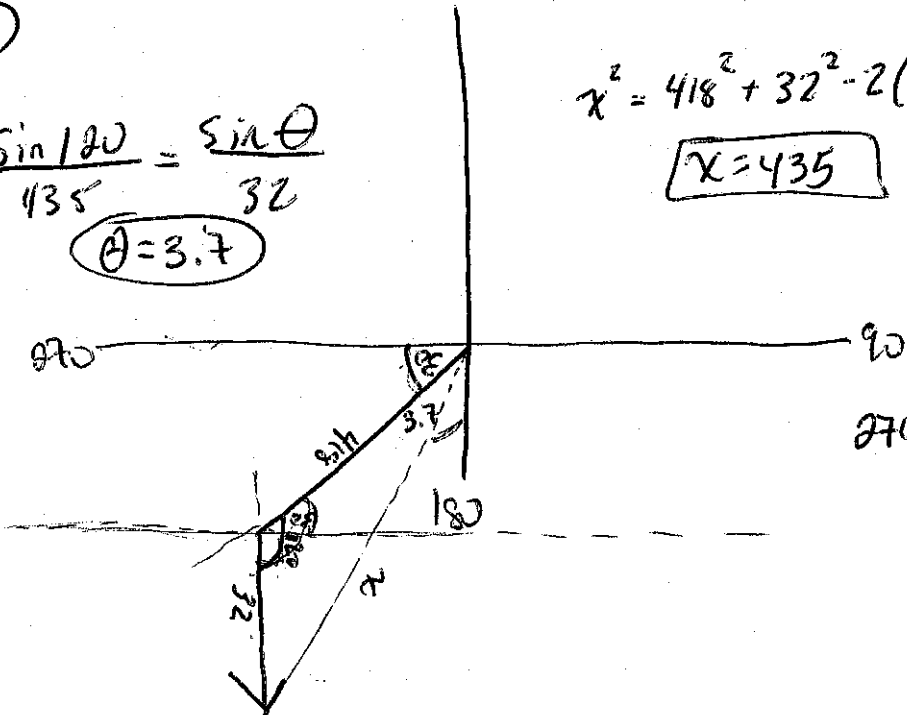
②

$$\frac{\sin 120}{435} = \frac{\sin \theta}{32}$$

$$\theta = 3.7$$

$$x^2 = 418^2 + 32^2 - 2(418)(32)\cos 120$$

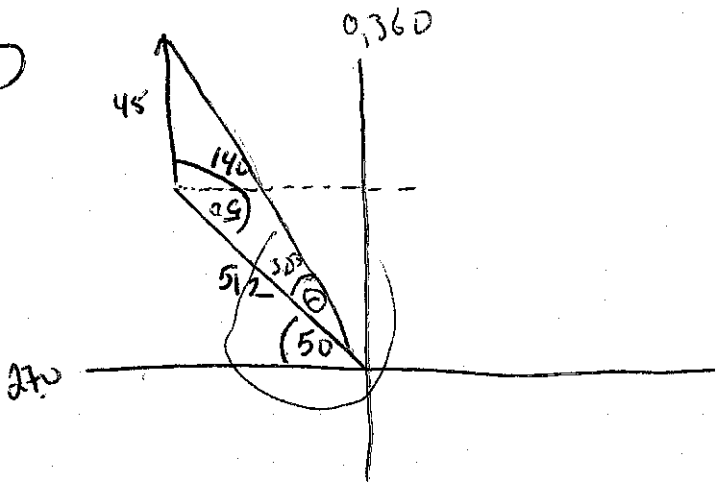
$$x = 435$$



$$270 - 30 - 3.7$$

$$236.3^\circ \text{ Bearing}$$

3



$$x^2 = 45^2 + 512^2 - 2(45)(512)\cos 140$$

$$x = 547$$

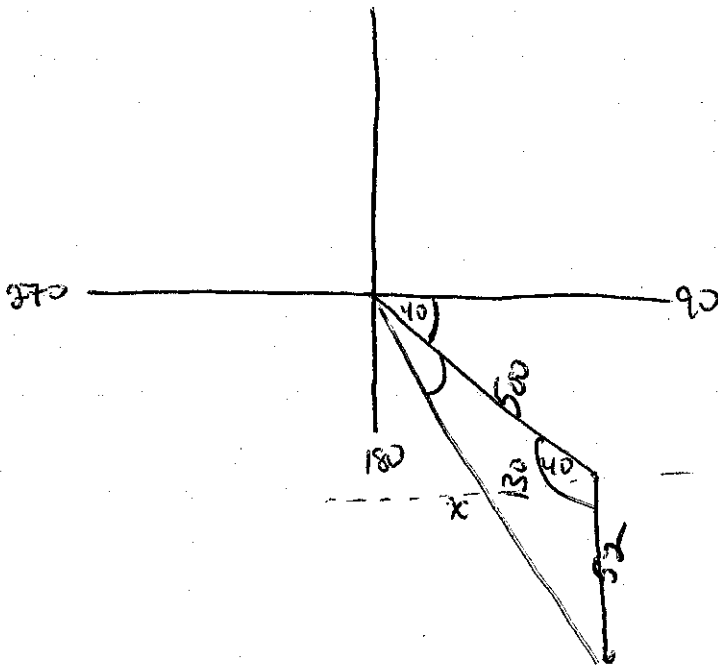
$$\frac{\sin \theta}{45} = \frac{\sin 140}{547}$$

$$\theta = 3.03$$

$$270 + 53.03$$

Bearing 323.03°
 ~~326.97°~~

4



$$x^2 = 500^2 + 52^2 - 2(500)(52)\cos 130$$

$$x = 540.9$$

$$534.9$$

$$\frac{\sin \theta}{52} = \frac{\sin 130}{540.9}$$

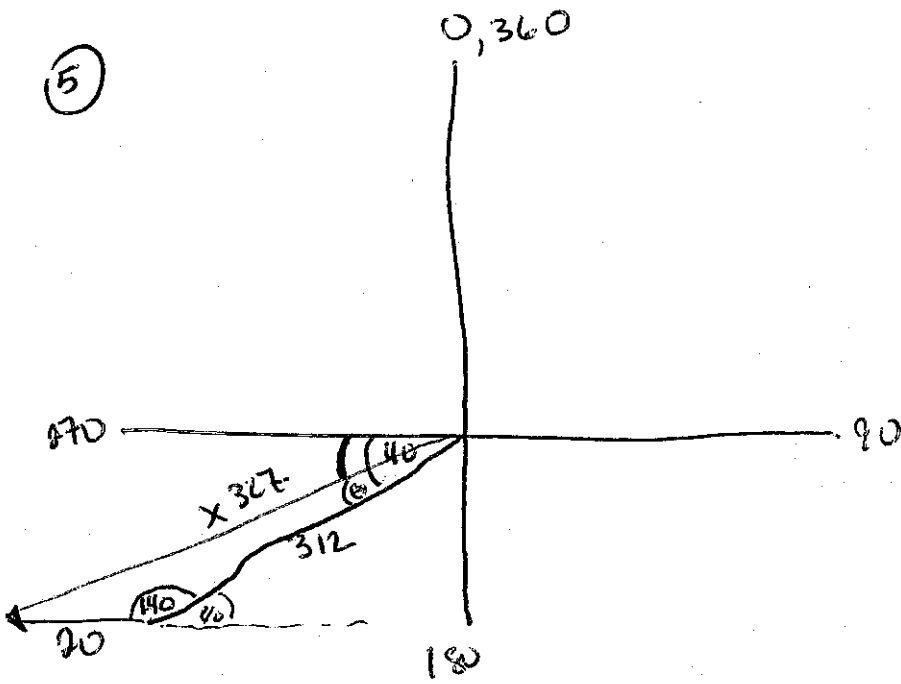
$$\theta = 4.3$$

$$4.3$$

$$90 + 4.3 + 90$$

134.3° Bearing 534.9 m/h
 ~~540.9~~

5



$$x^2 = 20^2 + 312^2 - 2(20)(312) \cos 140$$

$$x = 327$$

$$\frac{\sin 140}{327} = \frac{\sin \theta}{20} \quad \theta = 2.3$$

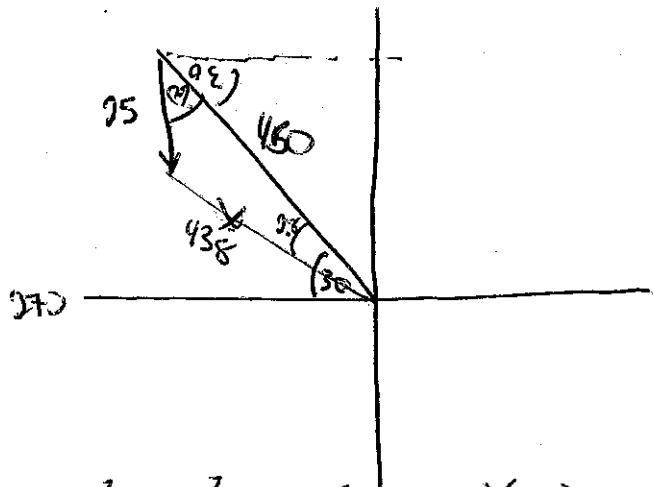
$$40 - 2.3 = 37.7$$

$$270 - 37.7 = 232.3^\circ \text{ bear}$$

327 m/h

232.3° bear

6



$$\frac{\sin \theta}{25} = \frac{\sin 60}{438}$$

$$\theta = 2.8$$

$$x^2 = 25^2 + 450^2 - 2(25)(450) \cos 60$$

$$x = 438$$

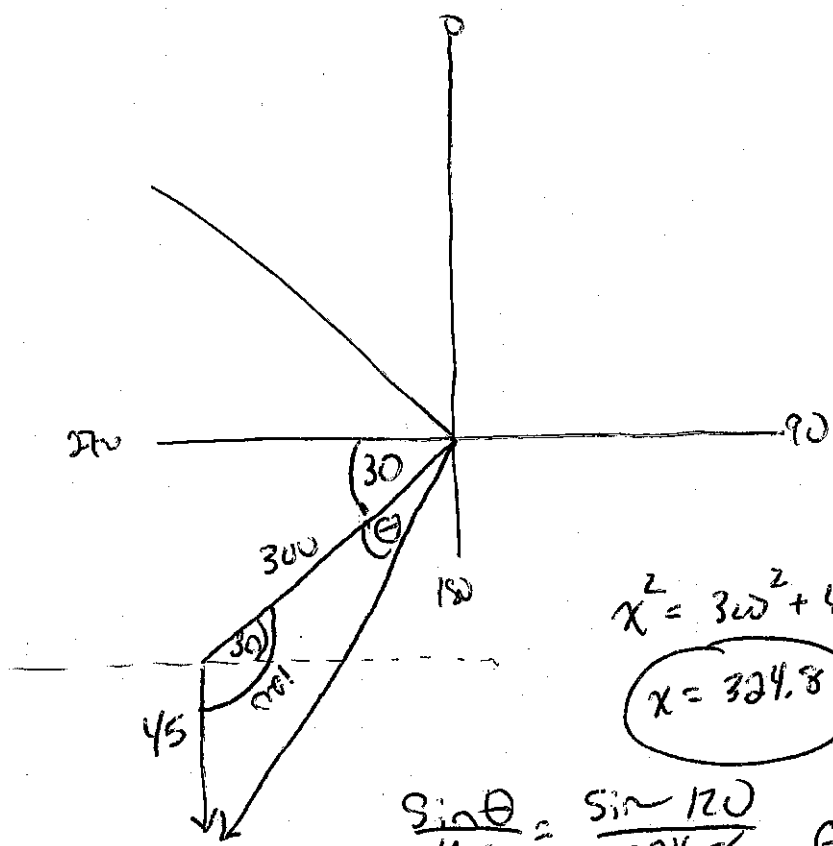
$$30 - 2.8 = 27.2$$

$$270 + 27.2$$

297.2

Assignment #13

#7



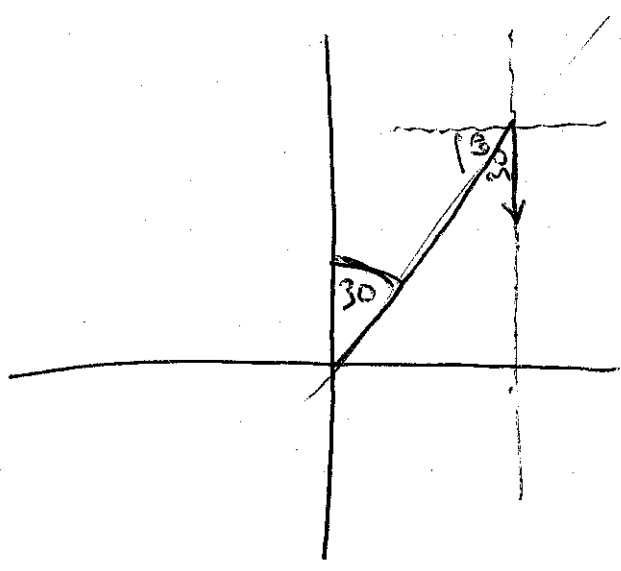
$$x^2 = 300^2 + 45^2 - 2(300)(45)\cos 120$$

$$x = 324.8$$

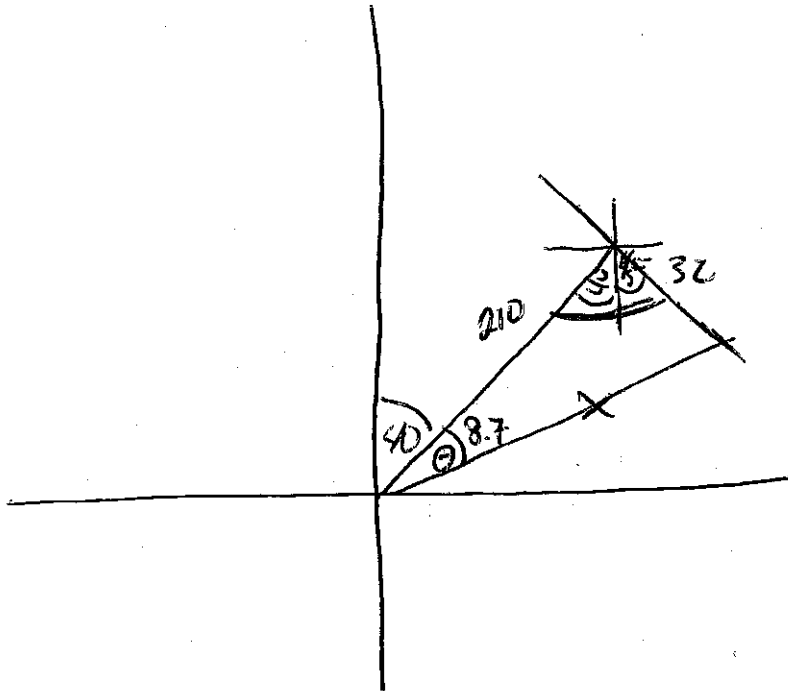
$$\frac{\sin \theta}{45} = \frac{\sin 120}{324.8} \quad \theta = 6.9^\circ$$

233.1° 324.8 m/hour

#8



(11)



$$x = 210^2 + 32^2 - 2(210)(32)\cos 85$$

$$x = 209.6 \text{ m/hour}$$

$$\frac{\sin \theta}{32} = \frac{\sin 85}{209.6}$$

$$\theta = 8.7$$

Bearing of 48.7