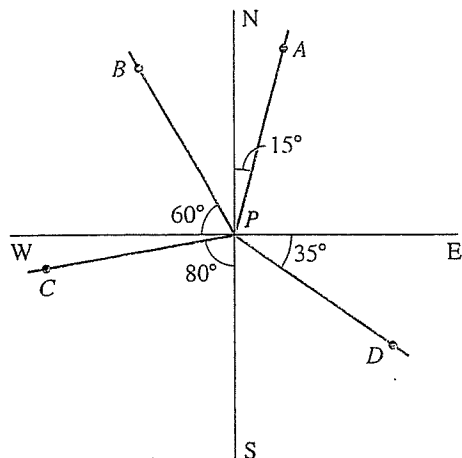


Geometry (H)
Section 8.7 – Trig Application Problems

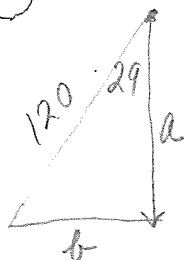
Name: KEY

1. Find the bearing from P to A, B, C and D.



- (A) N 15° E
- (B) N 30° W
- (C) S 80° W
- (D) S 55° E

2. A ship leaves port at noon and has a bearing of S 29° W. If the ship sails at 20 knots, how many nautical miles south and how many nautical miles west will the ship have traveled by 6 p.m?



$$\cos 29 = \frac{a}{120}$$

$$a \approx 104.954$$

South ≈ 105 miles

$$\sin 29 = \frac{b}{120}$$

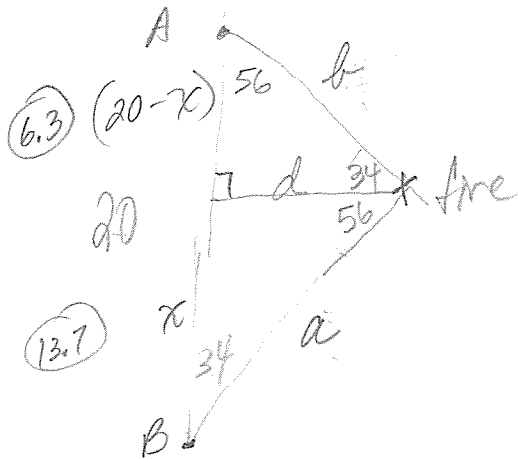
$$b \approx 58.1772$$

West ≈ 58.2 miles

3. Two towers are 20 miles apart, tower A being due North of tower B. A fire is spotted from the towers, and its bearing from tower A and tower B are S 56° E and N 34° E, respectively. How far is the fire from tower B? From tower A?

8-7 - Trig Application Problems

(3)



Treat as one large Rt Δ :

$$\cos 34 = \frac{a}{20}$$

$$a \approx 16.6 \text{ miles}$$

$$\cos 56 = \frac{b}{20}$$

$$b \approx 11.2 \text{ miles}$$

Solve this way to practice a system of equations:

$$\tan 56 = \frac{d}{(20-x)}$$

$$\rightarrow (20-x) \tan 56 = d$$

$$\tan 34 = \frac{d}{x}$$

$$\rightarrow x \tan 34 = d$$

$$(20-x) \tan 56 = x \tan 34$$

$$20 \tan 56 - x \tan 56 = x \tan 34$$

$$20 \tan 56 = x \tan 34 + x \tan 56$$

$$= x (\tan 34 + \tan 56)$$

$$\frac{20 \tan 56}{\tan 34 + \tan 56} = x$$

$$x \approx 13.7$$

$$\cos 56 = \frac{6.3}{b}$$

$$\rightarrow b \approx 11.2662$$

$$\text{11.3 miles}$$

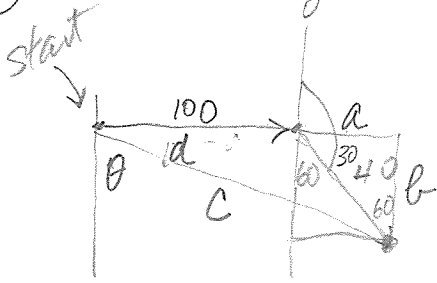
$$\cos 34 = \frac{13.7}{a}$$

$$a \approx 16.5$$

$$\text{16.5 miles}$$

BEARINGS WS

①



$$\sin 60 = \frac{a}{40} \quad \cos 60 = \frac{b}{40}$$

$$a \approx 34.6410 \quad b = 20$$

$$(34.6410)^2 + 20^2 = c^2$$

$$18,528.1989 = c^2$$

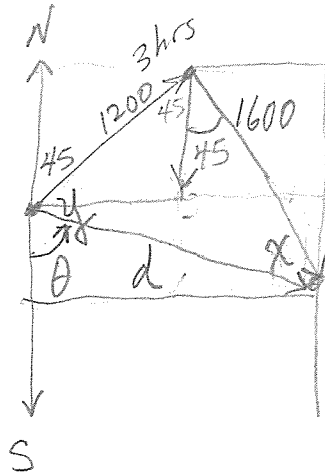
$$136.1183 \approx c$$

$$\sin d = \frac{20}{136.1183}$$

$$m\angle d \approx 8.449$$

$$\text{Bearing } S 82^\circ E$$

②



3, 4, 5 Rt. Δ .

$$1200, 1600, 2000$$

$$d = 2000 \text{ miles}$$

$$\sin x = \frac{1200}{2000}$$

$$m\angle x \approx 37^\circ$$

$$\cos y = \frac{1200}{2000}$$

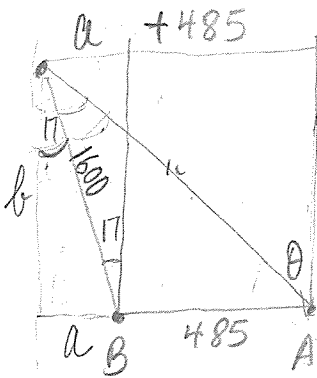
$$m\angle y \approx 53^\circ$$

$$m\angle \theta = 180 - (45 + 53)$$

$$= 82^\circ$$

$$\text{Bearing: } S 82^\circ E$$

③



$$\textcircled{1} \sin 17 = \frac{a}{1600}$$

$$a \approx 467.7947$$

$$\textcircled{3} \tan \theta = \frac{952.7947}{1530.0876}$$

$$\theta \approx 32^\circ$$

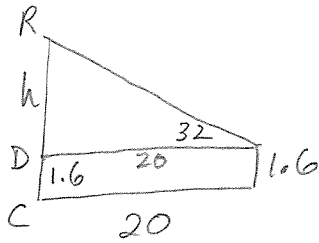
$$\textcircled{2} \cos 17 = \frac{b}{1600}$$

$$b \approx 1530.0876$$

$$\text{N } 32^\circ \text{ W}$$

KEY: PHOEBE USES TRIG RATIOS

①



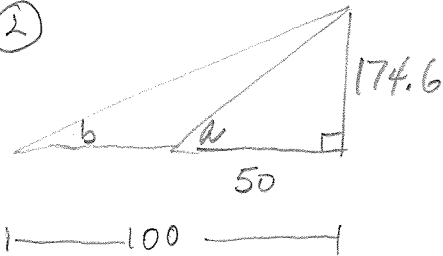
$$\tan 32 = \frac{h}{20}$$

$$h \approx 12.4974$$

$$12.5 + 1.6 = 14.1$$

Tree \approx 14.1 meters

②



$$\tan a = \frac{174.6}{50}$$

$$m\angle a \approx 74.02^\circ$$

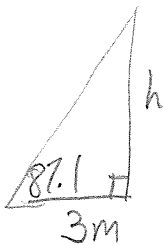
At 50m,
 \angle of ELEV. \approx 74°

$$\tan b = \frac{174.6}{100}$$

$$m\angle b \approx 60.199$$

At 100m,
 \angle of ELEV \approx 60.2°

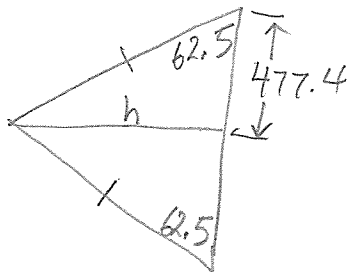
③



$$\tan 87.1 = \frac{h}{3}$$

$$h \approx 59.2m$$

④



$$\tan 62.5 = \frac{h}{477.4}$$

$$h \approx 917.0769$$

$$\text{Area} = (917.0769)(477.4)$$

$$\text{Area} \approx 437,812 \text{ sq. miles}$$

$$\begin{array}{r} 500,000 \\ -437,812 \\ \hline \end{array}$$

$$62,188 \text{ sq miles off}$$