

Geometry (H)
Section 8 - Homework

Name: K&J

1. A person at window W, 40 ft above street level, sights points on a building directly across the street. H is chosen so that \overline{WH} is horizontal. T is directly above H and B is directly below. Be measurement, $m\angle TWH = 61$ and $m\angle BWH = 37$. How far above street level is T?

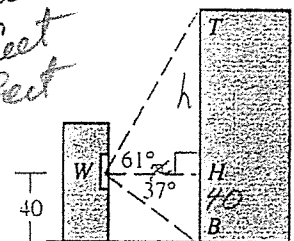
$$\tan 37 = \frac{40}{x}$$

$$x = 53.0818$$

$$\tan 61 = \frac{h}{53.0818}$$

$$h \approx 95.7621$$

T is about
135.8 feet
above street
level.



2. Use the figure to find EF to the nearest integer.

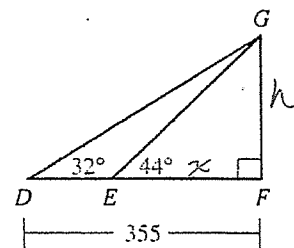
$$\tan 32 = \frac{h}{355}$$

$$h \approx 221.8286$$

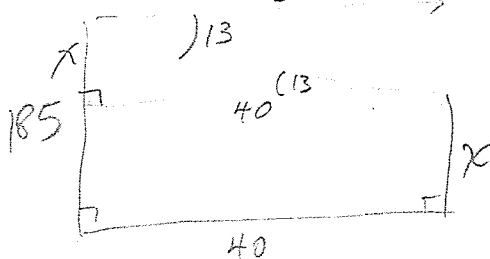
$$\tan 44 = \frac{221.8286}{x}$$

$$x = 229.7103$$

EF ≈ 229.7



3. Two buildings on opposite sides of a street are 40 m apart. From the top of the taller building, which is 185 m high, the angle of depression to the top of the shorter building is 13° . Find the height of the shorter building.



$$\tan 13 = \frac{x}{40}$$

$$x \approx 9.2347$$

185 - 9 = 176 feet

4. A soccer goal is 24 ft wide. Point A is 40 ft in front of the center of the goal. Point B is 40 ft in front of the right goal post. Which angle is larger, $\angle A$ or $\angle B$?

$$\tan B = \frac{24}{40}$$

$$m\angle B \approx 30.9638$$

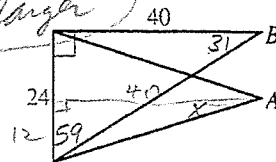
$$m\angle B \approx 31^\circ$$

$$\tan x = \frac{12}{40}$$

$$m\angle x \approx 16.6992$$

$$m\angle A \approx 33.3985 \approx 33^\circ$$

$\angle A$ is larger

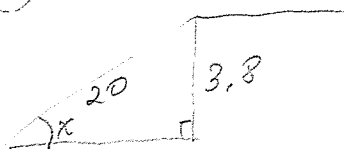


5. A ramp 20 feet in length rises to a loading platform that is 3.8 ft off the ground. Find the angle of elevation of the ramp.

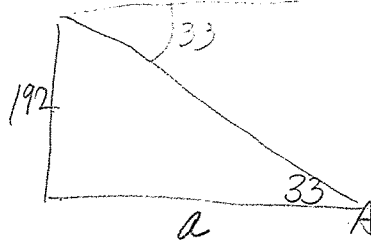
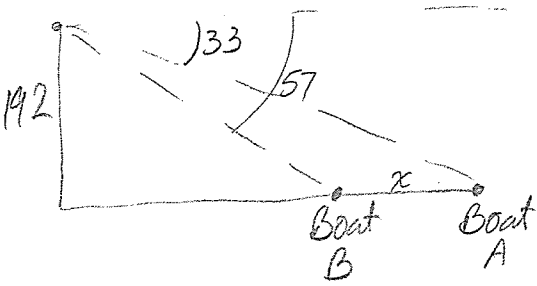
$$\sin x = \frac{3.8}{20}$$

$$m\angle x \approx 10.9528$$

Angle of elevation ≈ 11°

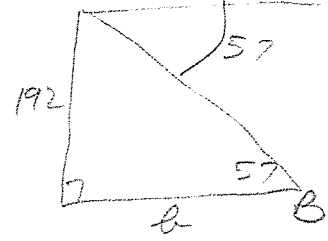


6. Olivia is in a lighthouse on a cliff. She observes two sailboats due east of the lighthouse. The angles of depression to the two boats are 33° and 57° . The lighthouse and cliff are 192 ft high. Find the distance between the two sailboats.



$$\tan 33 = \frac{192}{a}$$

$$a \approx 295.7$$

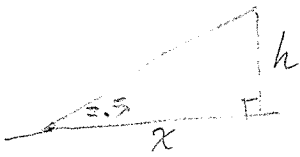


$$\tan 57 = \frac{192}{b}$$

$$b \approx 124.6863$$

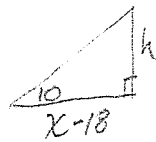
$$a - b = 171 \text{ feet apart}$$

7. While traveling across flat land, you notice a mountain directly in front of you. The angle of elevation to the peak is 2.5° . After you drive 18 miles closer to the mountain, the angle of elevation is 10° . Approximate the height of the mountain to the nearest tenth.



$$\tan 2.5 = \frac{h}{x}$$

$$x \tan 2.5 = h$$



$$\tan 10 = \frac{h}{x-18}$$

$$(x-18) \tan 10 = h$$

$$h = \frac{-18(\tan 10)(\tan 2.5)}{(\tan 2.5 - \tan 10)}$$

$$\begin{aligned} x \tan 2.5 &= (x-18) \tan 10 \\ x \tan 2.5 &= x \tan 10 - 18 \tan 10 \\ x \tan 2.5 - x \tan 10 &= -18 \tan 10 \\ x(\tan 2.5 - \tan 10) &= -18 \tan 10 \\ x &\approx \frac{-18 \tan 10}{(\tan 2.5 - \tan 10)} \\ x &\approx 23.9238 \end{aligned}$$

$$h = x \tan 2.5 \approx 1.0 \text{ mile}$$

8. A boat at location P is directly east of lighthouse A. The navigator sights a lighthouse B at 53° south of the east-west direction. The boat then travels 60 km in a path 16° east of the north-south direction to point Q. It is then directly east of lighthouse B. How far is the boat from B?

$$\sin 16 = \frac{x}{60}$$

$$x \approx 16.5382$$

$$\cos 16 = \frac{y}{60}$$

$$y \approx 57.6757$$

$$\tan 53 = \frac{y}{w}$$

$$\tan 53 = \frac{57.6757}{w}$$

$$w \approx 43.4618$$

$$BQ \approx 60 \text{ km}$$

