Geometry

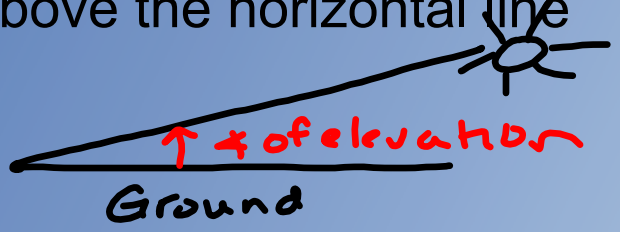
Ch. 8 Handout 8.5

Angles of Elevation and Depression

Angle of elevation

Pull

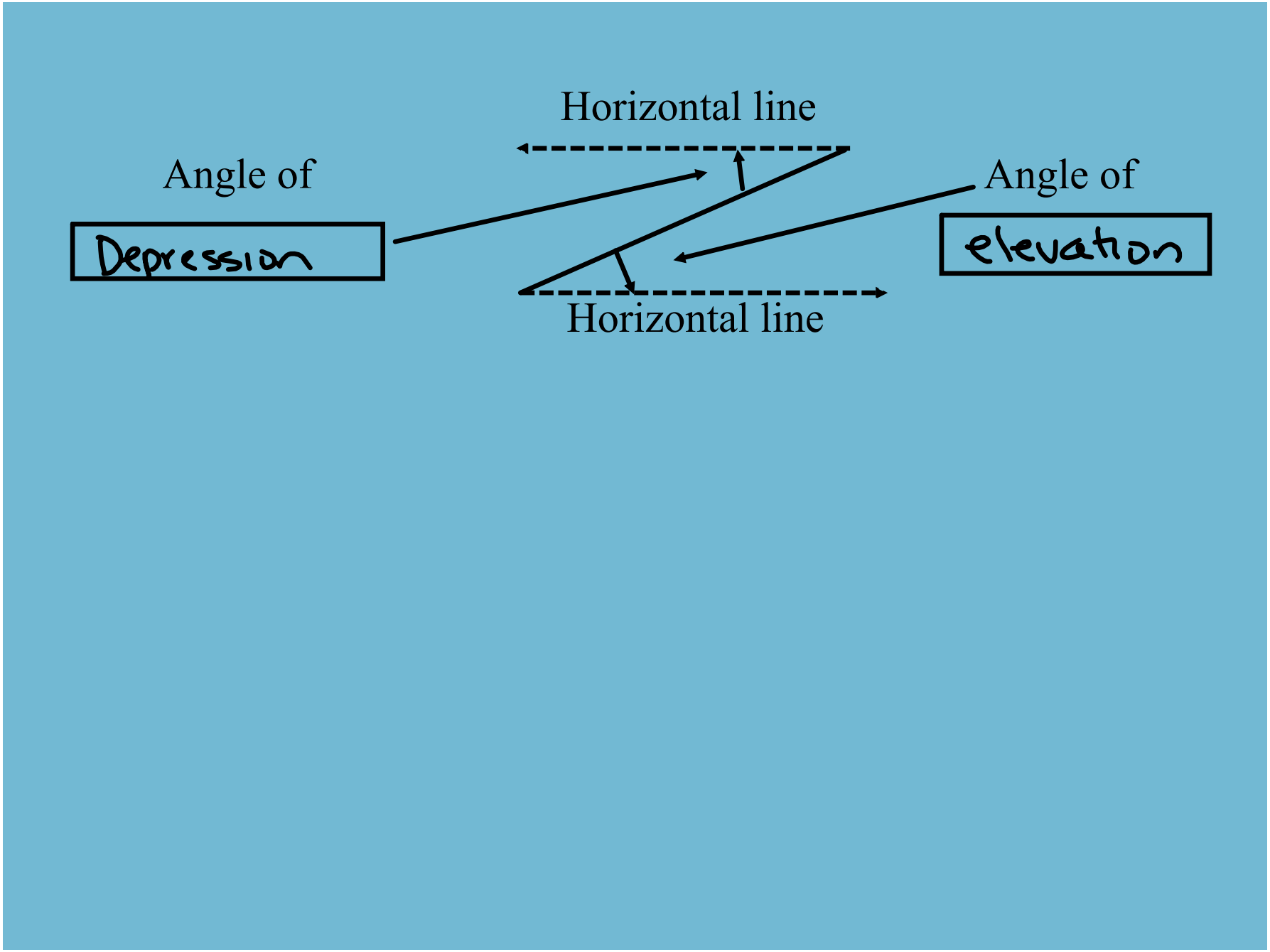
is the angle formed by a horizontal line and the line of sight to an object above the horizontal line



Angle of depression

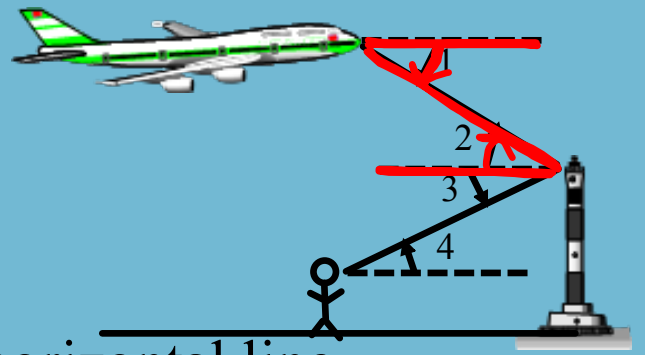
Pull

is the angle formed by a horizontal line and the line of sight to an object below the horizontal line


Horizontal line
Angle of
Depression
Angle of
elevation
Horizontal line

Identifying Angles of Elevation and Depression

Describe $\angle 1$ and $\angle 2$ as they relate to the situation shown.



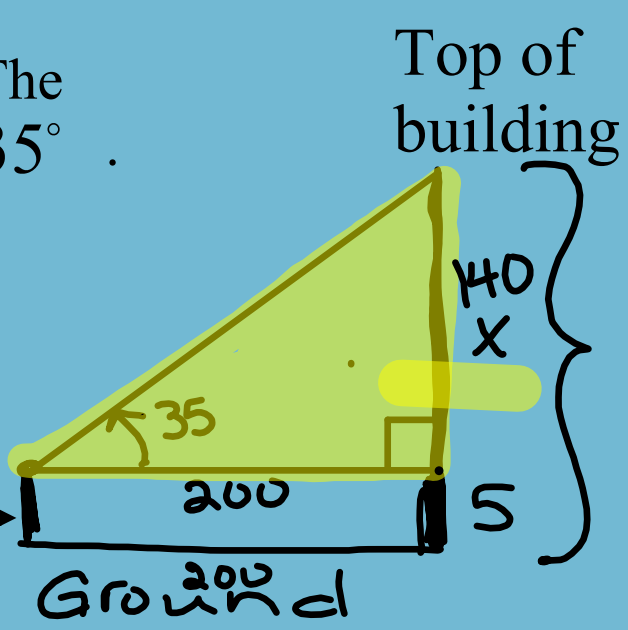
One side of the angle of depression is a horizontal line.

$\angle 1$ is the angle of depression from the plane to the lighthouse.

One side of the angle of elevation is a horizontal line.

$\angle 2$ is the angle of elevation from the lighthouse to the plane.

2. A surveyor stands 200 ft from a building to measure its height with a 5-ft tall theodolite. The angle of elevation to the top of the building is 35°. How tall is the building?



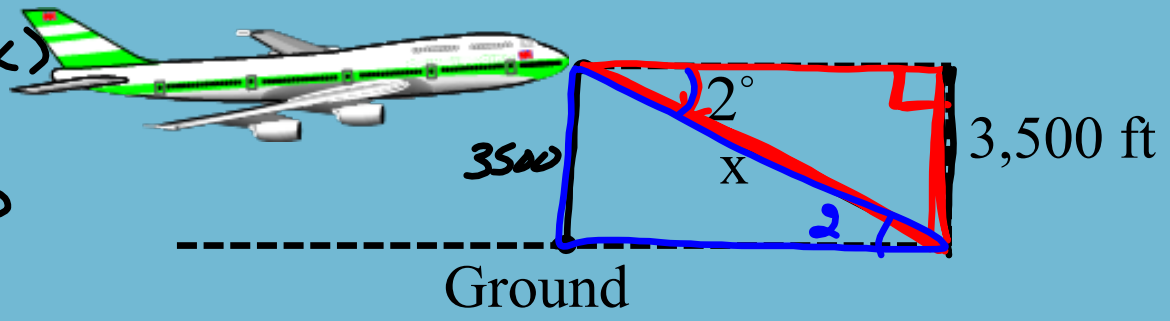
$(200)\tan 35 = \frac{x}{200}(200)$

$200\tan 35 = x$

$x \approx 140$

Height of building $\approx$ 145 ft

3. An airplane flying 3500 ft above the ground begins a 2° descent to land at the airport. How many miles from the airport is the airplane when it starts its descent? (Note: the angle is not drawn to scale.)



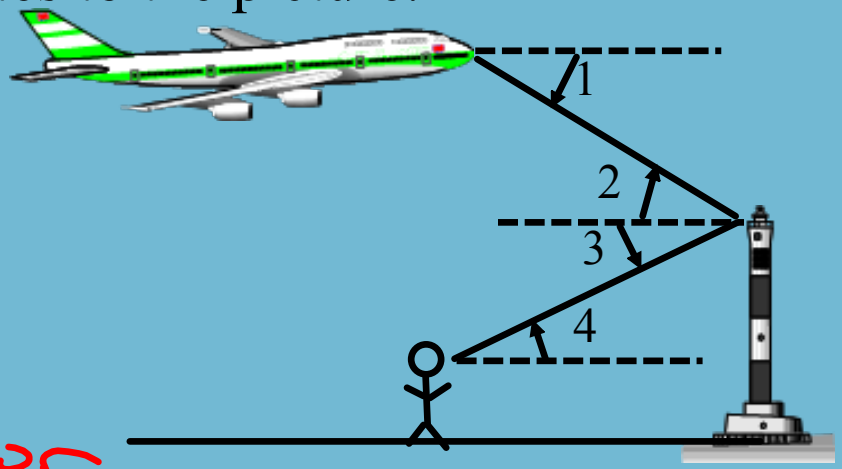
$\sin 2 = \frac{3500}{x}$ (x)

$x \sin 2 = 3500$

$x = \frac{3500}{\sin 2}$

$x \approx 100{,}288$ ft

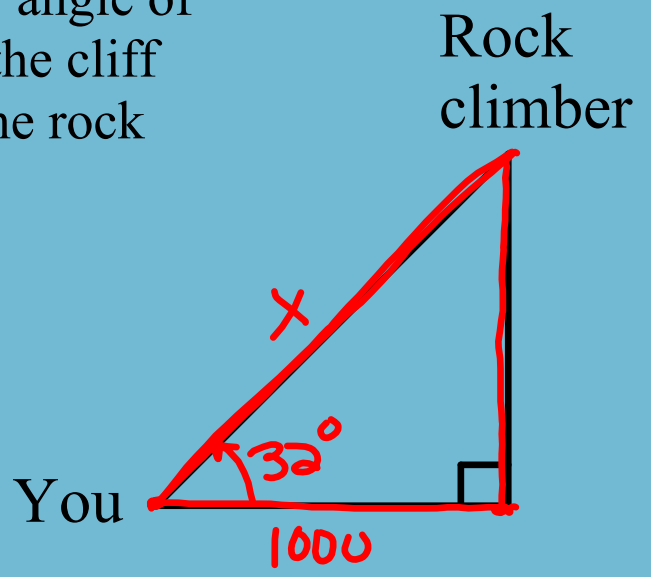
4. Describe each angle as it relates to the picture.



a) $\angle 3 =$ ∠ of depression

b) $\angle 4 =$ ∠ of elevation

5. You sight a rock climber on a cliff at a 32° angle of elevation. The horizontal ground distance to the cliff is 1000 ft. Find the line-of-sight distance to the rock climber.



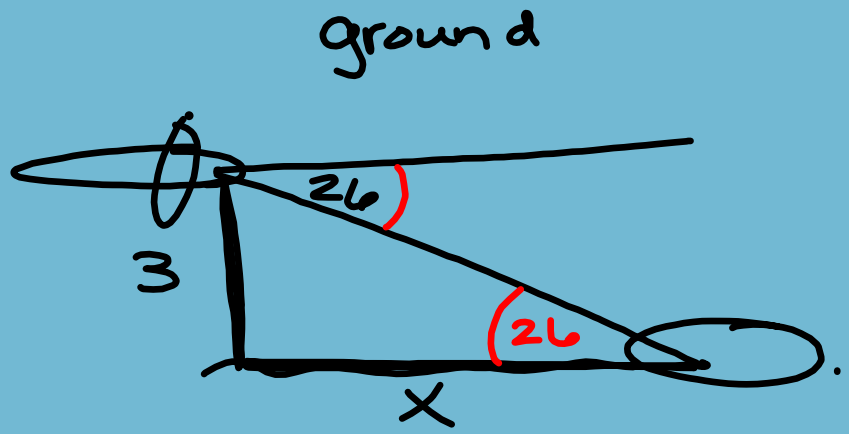
$x \cos 32 = \frac{1000}{x}(x)$

$x \cos 32 = 1000$

$x = \frac{1000}{\cos 32}$

$x \approx 1179$ ft

6. An airplane pilot sees a life raft at a 26° angle of depression. The airplane's altitude is 3 km. What is the airplane's ~~surface~~ distance*d* from the raft?



$\tan 26 = \frac{3}{x}$

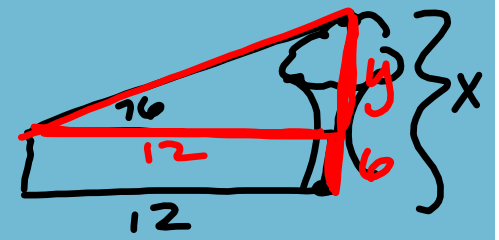
$x \tan 26 = 3$

$x = \frac{3}{\tan 26}$

$x \approx 6.2$ km

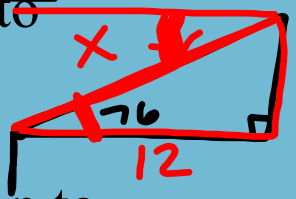
7. a) A 6-ft man stands 12 ft from the base of a tree. The angle of elevation from his eyes to the top of the tree is 76°. About how tall is the tree

$\tan 76 = \frac{y}{12}$ $12 \tan 76 = y$ $y \approx 48.1 + 6$ height of tree ≈ 54.1 ft



b) If the man releases a pigeon that flies directly to the top of the tree, about how far will it fly?

$\cos 76 = \frac{12}{x}$ $x \cos 76 = 12$ $x = 12/\cos 76$ → 49.6 ft



c) What is the angle of depression from the treetop to the man's eyes?

→ 76°

Assignment:

Day 1: pgs 447-449 1-23 odds