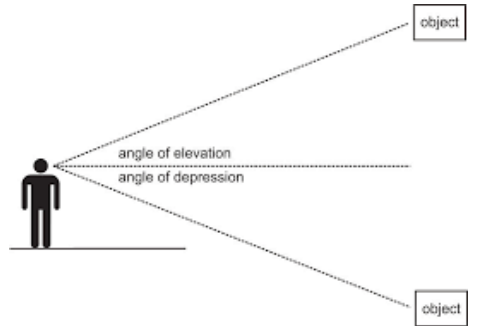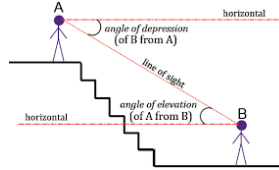# Trig Word Problems

2 keys terms for word problems:

Angle of Inclination (elevation): measured up from horizontal

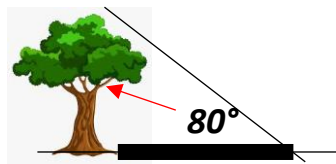**Angle of Depression: measured down from horizontal**

Due to parallel line theory ... they are equal
(alternate interior angles)

1)   A tree casts a 6.0 m shadow when the angle of inclination of the sun's rays is 80°

a)   Find the height of the tree

tree = opp   shadow = adj

6 m shadow $\tan 80° = \frac{t}{6}$ **t = 34 m**

b)   the length of shadow when angle becomes 75°

tree is still 34 m

$\tan 75° = \frac{34}{s}$ **s = 9.11 m**

2)   A 1.8 m tall tri-pod, set a 65°, measures the height of a cliff. It is placed 20 m from base of cliff. Find the cliff height
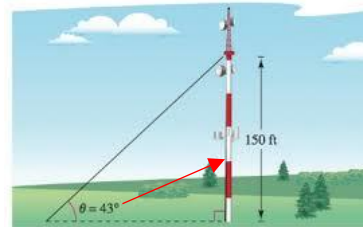
cliff = opp   20 = adj

$\tan 65° = \frac{c}{20}$ **c= 42.89 m**   **cliff = 42.89 + 1.8**

65°   **cliff**

20 m   **Cliff = 44.7 m**
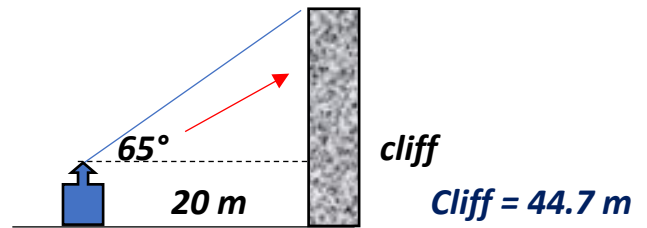
3a)   How long is the guy wire in the diagram

Tower = opp, wire = hyp $\sin 43° = \frac{150}{w}$

W = 219.94m

b)   A 2nd wire is attached to the top of the tower that is 260 m long and makes an angle of inclination of 50°. How big is the top section of the tower?

$\sin 50° = \frac{t}{260}$ **t = 199.17 ft so top of tower = 199.17 – 150**   **or 49.17 ft**

4)   A 6m long ramp rises 1.2 m. Find the slope and angle of this ramp

6

R   **1.2**

$\sin R° = \frac{1.2}{6}$ **R = 11.5°**   **6^2-1.2^2= run² run =5.879 so m =** $\frac{1.2}{5.879} = 0.204$ *(or use tan 11.5°)*
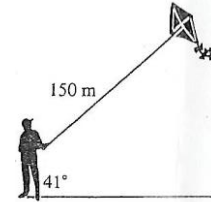
Assignment = worksheet

Trig Word Problems

1) When the foot of a ladder is 2.0 m from a wall, the angle of inclination of the ladder is 68°
**a)** How high the wall will the ladder reach?
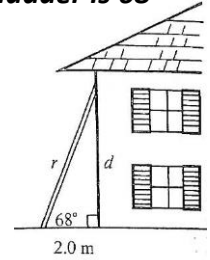
b) How long is the ladder?

r   *d*
68°
2.0 m

**2)** A kite string is 150 m long and is held at a height of 1.8m.
If the string makes an angle of 41° (measured parallel to the ground),
how high is the kite?

150 m
41°

3) In the diagram, an observer O, is directly opposite a
hydro pole at A, on the other side of the canal. A tree, B is 30m
from O. If B = 64°, and the tree and pole are both 1.3 m from
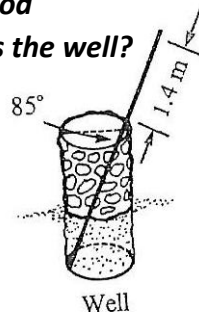the canal, how wide is the canal?

O   30 m   B
64°
x
A
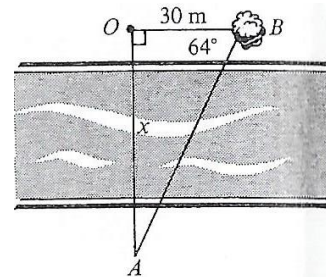
4) A 10.0 m long ladder leans against a vertical wall at an angle of 73°. Find:
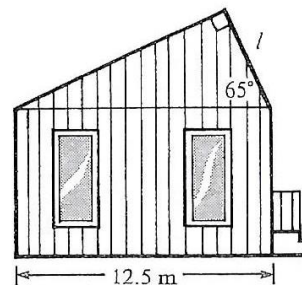**a)** height the ladder reaches up the wall
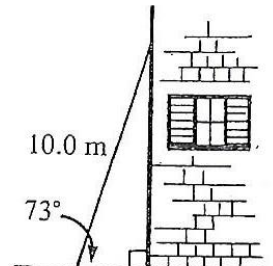
b) how far the foot of the ladder is from the wall

10.0 m
73°

5) The diagram shows a 10.0m long rod
protruding 1.4 m from a well. How deep is the well?

85°
1.4 m
Well

6) Find the length of the solar panels
on the solar heated house below.

l
65°
12.5 m

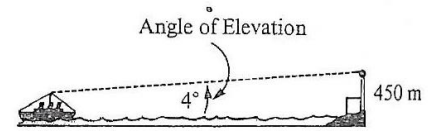**7)** The top of a communications tower has an angle of elevation of 6°
when observed by a 8m tall ship 8km from the base of the cliff below the tower.
How high is the top of the tower above see level (in meters)

f
6°
8 km
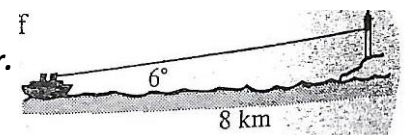
8) A communications tower is 450 m high. From a ship at sea, its Angle of elevation is 4°

Angle of Elevation

a) How far is the ship from the tower?

4°   450 m

b) If the ship was 25 km away, what would the angle of elevation be to the tower top?

9) To measure the height of clouds or "ceiling" at night airport controllers can beam a light vertically and measure the angle of elevation of the spot of light made on the clouds
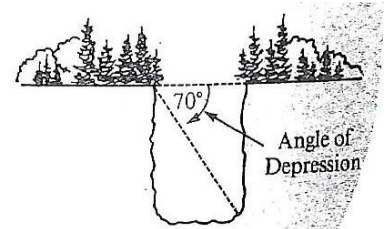
a) Find the height of the clouds shown

b) What would the angle of elevation be if the clouds were 500 m high?

78°
← 250 m →
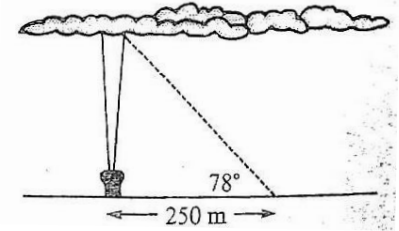
10) A gorge has a rectangular cross section that is 65m wide. The angle of depression of the bottom corner when viewed from the opposite edge is 70°.

a) How deep is the gorge?

70°
Angle of Depression

b) What would the angle of depression be if the gorge was 100 m deep?

11) A mountain road rise 1m for every 5 m along the road. Find the angle of elevation of the road.	**12)** The diagonal of a rectangle is 15cm long And makes a 20° angle with the longer side Find the area of the rectangle by finding the sides
13) From a distance of 80.0 m the angle of inclination to the top of a flagpole is 18°. How tall is the flagpole?	**14)** A radio tower is 350 m high. If the sun's Rays make an angle of 39° with the ground, find The length of the tower's shadow.
15) An airplane is at an altitude of 6 km and the Angle of depression to the coastline is 14°. The plane Is low on fuel … how far does it need to fly to reach the coast?	****16)** Find where the 20m telephone pole broke

20 - X
35° |