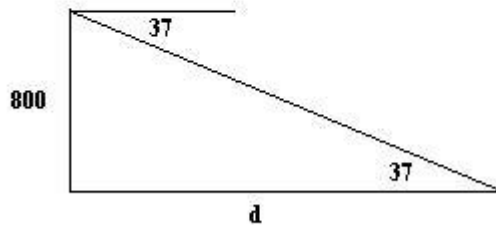(1.)   From the top of a cliff 800 meters high, the angle of

depression to the base of a log cabin is 37° .   Find

the distance from the cabin to the foot of the cliff.

Here is the diagram:

37

800

37

d

   tan 37 = 800/d   use this trig equation
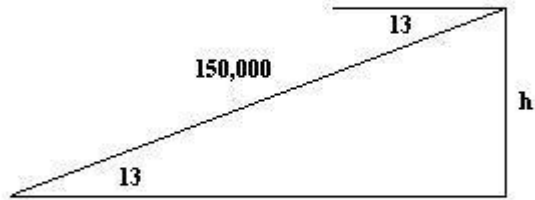
d tan 37 = 800   multiply each side by d, cancel

_____ _____

 tan 37   tan 37   divide each side by tan 37

d = 1061.6   use calculator and cancel

(2.)   An airplane over the Atlantic Ocean is 150,000 feet

from shore.   The angle of depression of the shore is

13° .   Find the altitude, h, of the plane.

Here is the diagram:

sin 13 = h/150,000   use this trig equation

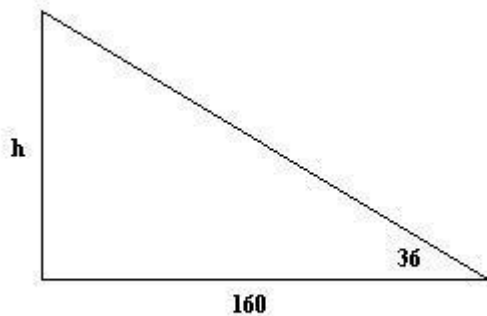h/150,000 = sin 13   just rearrange like this

h = 150,000 sin 13   multiply each side by 150,000, cancel

h = 33,742.658   use calculator

(3.)   A building casts a shadow of 160 feet. From the end

of the shadow the angle of elevation of the sun is 36° .

Find the height of the building.

Here is the diagram:

tan 36 = h/160   use this trig equation

h/160 = tan 36   just rearrange like this

h = 160 tan 36   multiply each side by 160, and cancel
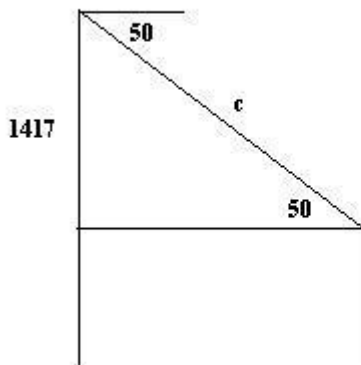
h = 116   use calculator

(4.)   Two mountain stations are connected by a cable car.

The angle of depression of the cable is 50° .   The

vertical distance between the stations is 1417 meters.

Find the length of the cable.

Here is the diagram:

sin 50 = 1417/c   use this trig equation

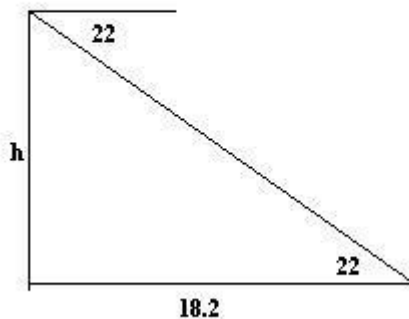c sin 50 = 1417   multiply each side by c and cancel

_____ _____
 sin 50   sin 50   divide each side by sin 50

c = 1850   use calculator and cancel

(5.) A flagpole casts a shadow 18.2 meters long. From the end

of the shadow, the angle of elevation of the sun is 22° .

Find the height fo the flagpole.

Here is the diagram:

tan 22 = h/18.2   use this trig equation

h/18.2 = tan 22   just rearrange like this

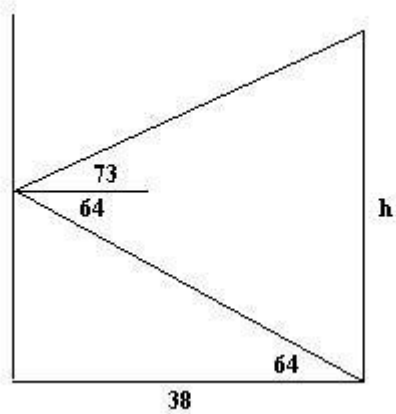h = 18.2 tan 22   multiply each side by 18.2, cancel

h = 7.35   use calculator

(6.) The Hirsch Building and the County Hospital are 38 meters

apart. From a window in the Hirsch Building, the angle of

elevation of the top of the hospital is 73° . From the

same window the angle of depression of the ground at the

base of the hospital is 64° . Find the height of the

hospital.

Here is the diagram:

tan 64 = a/38   use this trig equation

a/38 = tan 64   just rearrange like this

a = 38 tan 64   multiply each side by 38, cancel

a = 78   use calculator

tan 73 = b/38   use this trig equation

b/38 = tan 73   just rearrange like this

b = 38 tan 73   multiply each side by 38, cancel

b = 124.3   use calculator

h = a + b   use this equation to find h

h = 78 + 124.3   make substitutions

h = 202.3   add

(7.) Two boats are observed from a tower 75 meters above a

lake. The angles of depression are 12.5° and 7° . How

far apart, to the nearest meter, are the boats?

Here is the diagram:
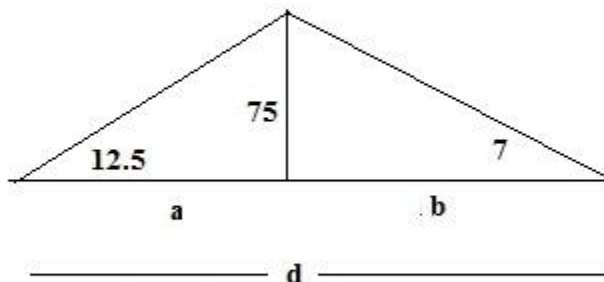
tan 12.5 = 75/a   use this trig equation to find a

a tan 12.5 = 75   multiply each side by a, cancel
_____ _____
  tan 12.5   tan 12.5   divide each side by tan 12.5

a = 338.3   use calculator and cancel

tan 7 = 75/b   use this trig equation to find b

b tan 7 = 75   multiply each side by b, cancel
_____ _____
  tan 7   tan 7   divide each side by tan 7

b = 611   use calculator and cancel

d = a + b   use this equation to find d

d = 338.3 + 611   make substitutions

d = 949.3   add

(8.)   An aviator observes the measure of the angle of

depression of a marker to be 36° .   The plane is 2000

meters above the ground.   How far from the marker is

the point on the ground directly under the plane?

Here is the diagram:


```
        _____
        \   36
         \
          \
2000       \
            \
             \
              \   36
               \
        _____
            d
```
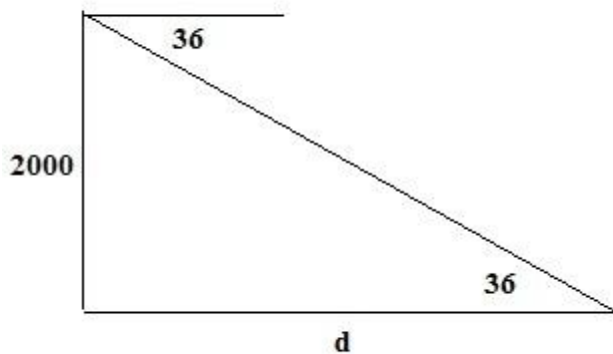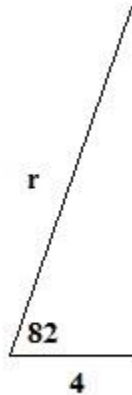
tan 36 = 2000/d   use this trig equation

d tan 36 = 2000   multiply each side by d, cancel
_____   _____
 tan 36   tan 36   divide each side by tan 36

d = 2752.76384   use calculator and cancel

(9.)   A camp director wishes to buy a new rope for a

        flagpole at the camp.   At a point 4 meters from the

        foot of the pole, she measures the angle of elevation

        to the top of hte pole and found it to be 82° .   What

        length rope should she buy if she wants it to be double

        the distance from the top of the pole to the spot from

        which she measured the angle?

Here is the diagram:

    cos 82 = 4/r   use this trig equation to find r

    r cos 82 = 4   multiply each side by r and cancel
    _____ _____
    cos 82   cos 82 divide each side by cos 82
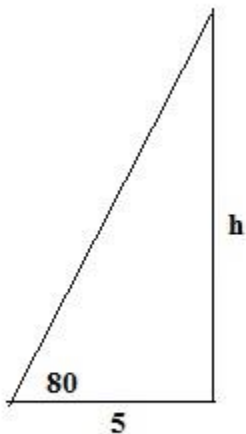
r = 28.7   use calculator and cancel

2r = 2(28.7) = 57.4   multiply by 2

result: she should buy a 57.4 meter rope.

(10.) At a point 5 meters from the base of a building, the

angle of elevation of the top of the building is 80° .

Find the height of the building.

Here is the diagram:

tan 80 = h/5   use this trig equation

h/5 = tan 80   just rearrange like this

h = 5 tan 80   multiply each side by 5, cancel

h = 28.3564