**ASSIGNMENT 17a– USING ANGLE OF ELEVATION AND DEPRESSION**

Check that your calculator is on degrees “**DEG**”.

**Using the *angle of elevation* and the *angle of depression* correctly in triangles is a challenging concept. If you are having difficulties with these next 2 pages, make sure you discuss it with your teacher.**

1) in the triangle below, what is the measure of the *angle of elevation*?

650

Measure: 25 degrees

250

2) Write the degree measurement of the *angle of elevation* in each diagram. Then find the length of the unknown side, to one decimal place. Show all work.

a) Angle of elevation = 430 Sin 43 = 18.5/Sin 43

= w = 27.13 ft

w

18.5 ft

b) Angle of elevation = 210

Cos 21 = x/5.6 m = 5.6 x Cos 21

= x = 2 m

5.6 m

x

3) In the diagram below, what is the measure of the *angle of depression*? How do we name the angle of depression in this diagram? (See page 3 if you need a review.) The angle marked 430 is not *inside* the triangle ABC. Where in the triangle does the angle that is 430 go?

A D

430 Measure: 43 degrees

Name: A

B C

4) Write a degree measurement *in* the triangle in the correct place for each diagram. Then find the length of the unknown side, to one decimal place. Show all work.

a)

Cos 61 = y/6.4 = 6.4 cm x Cos 61

= y = 5.6 cm

610

*y* 6.4 cm

b) Tan 18 = 8.2/z = 8.2 in./Tan 18

= z = 25.2 in.

180

8.2 in.

*z*

5) The angle of elevation from the ground to the top of a flagpole is 140. Draw a sketch to illustrate this situation.

Sketches on paper

6) From a building, the angle of depression to a fountain is 620. The fountain is 75 meters away (along the ground) from the building. Draw a sketch to illustrate this situation.

Sketches on paper

7) From the top of a 45-meter-tall pole, the angle of depression to the ground is 120. Draw a sketch to illustrate this situation, and then find the distance from the top of the pole to the ground along the sight line.

Sin 12 = x/4.5 = 4.5 / Sin 12 = 21.64 m

Along the sight line, it is 21.64 m.

8) A ramp makes an angle of 220 with the ground. If the end of the ramp is 1.5 m vertically (**↑**) above the ground, how long is the ramp?

Sin 22 = x/1.5 = 1.5/ Sin 22 = 4 m

The ramp is 4 m.

9) A weather balloon, which is blowing in the wind, is tied to the ground with a 15 m string. How high is the balloon (***x***) if the angle between the string and the ground is 380?

Sin 38: x/15 = 15 x Sin 38 = 9.23 m

9.23 m is how high the balloon is.

balloon

15 m

*x* string

380

10) A child’s slide makes a 200 angle to the ground as it rises to a platform. If the

horizontal distance that the slide covers is 25 m long, how long is the slide?

Sin 20 = 25/x = 25/ Sin 20 = 26.60 m

The slide is about 26.60 m long. platform

200

11) A flagpole is anchored to the ground by a guy wire that is 12 m long. The guy wire makes an angle of 630 with the ground. How far from the base of the flagpole must the guy wire be anchored into the ground?

Cos 63 = x/12 = 12 x Cos 63 = 5.45 m

12) A man stands 15 m from the base of a tree. He views the top of the tree at an angle of elevation of 580. How tall is the tree?

Cos 58 = x/15 = 15 x Cos 58 = 7.95 m

The tree is about 7.95 m tall.

13) How far from the side of a house is the base of a ladder if the angle of elevation is 700 and the ladder reaches 15 feet up the side of the house?

Tan 70 = 15/x = 15/Tan 70 = 5.46 m

The base of the ladder is about 5.46 m.

**ASSIGNMENT 17B – FINDING ANGLES in right triangles**

1) Calculate the following angles to the nearest whole degree. Show your work!

a) sin D = 0.5491 b) cos F = 0.8964

sin D = 33 degrees cos F = 26 degrees

c) tan G = 2.3548 d) sin P = 0.999 tan G = 67 degrees sin P = 87 degrees

e) cos Q = 0.3097 f) tan R = 0.4663

cos Q = 72 degrees tan R = 25 degrees

2) After an hour of flying, a jet has travelled 300 miles, but gone off course 48 miles west of its planned flight path. What angle, θ, is the jet off course?

48 mi

Sin = o/h = Sin-1(48/100)

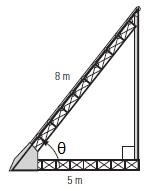
Theta = 28.69 = 29 degrees

300 mi

θ

3) At what angle, θ, to the ground is an 8 m long conveyor belt if it is fastened 5 m from the base of the loading ramp?

Cos = a/h = Cos-1(5/8)

Theta = 51.37 = 51 degrees

4) If a boat is 150 m from the base of a 90 m cliff, what is the angle of elevation from the boat to the top of the cliff?

Cos = a/h = Cos-1(90/150)

= 53.13 degrees = 53 degrees

The angle of elevation to the top of the cliff is about 53 degrees.

5) In a right triangle, ΔXYZ, the ratio of the opposite side to ∠X to the hypotenuse is 7:8 or  . What is the approximate size of ∠X?

7/8 = 87.5 % = 88 %

The approximate size of X is 0.88.

6) What is the angle of depression, θ, from the top of a 65 m cliff to an object 48 m from its base?

Cos = a/h = Cos-1(48/65)

Θ = 42 degrees

The angle of depression from the cliff is 42 degrees.