#### Lesson Plan

Lesson: <u>7 - 4</u>

Grade 10 Academic Math

Unit: <u>Trigonometry</u>

Topic: Solving Right Triangle Problems

# *homework check:* <u>Principles of Mathematics 10</u> p. 404 #2, 3, 6, 8, 10, 14

### *i note:* <u>Solving Right Triangle Problems</u>

In order to solve word problems, we need to know that angles of depressions are measured down from the horizontal. Angles of inclination (or elevation) are measured up from the horizontal. For example,



a) A tree is 12 m high. When the sun is at an angle of depression of 32 degrees, how long is the shadow?

### Step 1: draw a picture



- Step 3: find missing angle
- Step 4: solve for unknown side

$$\tan x = \frac{opp}{adj}$$
$$\tan 58 = \frac{12}{x}$$
$$x \tan 58 = 12$$
$$x = \frac{12}{\tan 58}$$
$$x = 7.5m$$

b) A man on a cliff can see an airplane in the air at an angle of inclination of 37 degrees. The same man can also see a boat in the water at an angle of depression of 62 degrees. If the cliff is 23 m high, how high is the plane above the boat?



Step 2: identify sides and ratios Step 3: make a plan Step 4: solve for unknowns

Because the distance between the boat and point C is the same as the height of the cliff, we can use the tangent ratio to find the distance between the cliff and point C.

$$\tan x = \frac{opp}{adj}$$
$$\tan 62 = \frac{23}{x}$$
$$x \tan 62 = 23$$
$$x = \frac{23}{\tan 62}$$
$$x = 12.2m$$

Now that we know the distance between the cliff and point C, we can move into the airplane triangle. With the distance between the point C and the cliff's edge, we can use the tangent ratio again to find the distance between point C and the airplane.

$$\tan x = \frac{opp}{adj}$$
$$\tan 37 = \frac{x}{12.2}$$
$$12.2 \tan 37 = x$$
$$x = 9.2m$$

Therefore the total distance between the boat and the plane is 9.2 + 23 = 32.2 m.

# *homework assignment:* <u>Principles of Mathematics 10</u> p. 412 #4 – 14