

Draw Diagrams. Show work. Round off all answers to one decimal place. (3 marks each)

- 1.) The angle of elevation of the Rock Mountain fire-control tower from the top of Blue Mountain 3.0 km away (horizontal distance) is  $18^\circ$ . How much higher than Blue Mountain is the fire-control tower? **0.97 km**
  
- 2.) The angle of elevation of the summit from the bottom of the second lift at Snow Bowl is  $33.0^\circ$ . If a skier rides 1000. m on this lift to the summit, what is the vertical distance between the bottom of the lift and the summit? **545 m**
  
- 3.) The angle of depression of an aircraft carrier from an approaching airplane is  $52.2^\circ$ . If the plane is 700. m above level of the deck of the carrier, how far away (horizontally) is the carrier? **543 m**
  
- 4.) The navigator on a bomber finds that the angle of depression of a target 4.00 km away is  $11.4^\circ$ . At what altitude is the plane flying? **0.791 km**
  
- 5.) Billy's kite has a string 40. m long and is flying 27 m above his eye level. Find the angle of elevation of the kite.  **$42^\circ$**

- 6.) At an airport, cars drive down a ramp  $96\text{ m}$  long to reach the lower level baggage-claim area  $13\text{ m}$  below the main level. What angle does the ramp make with the ground at the lower level?  $7.8^\circ$
- 7.) A surveyor standing in a ravine finds the angle of elevation of the top of one side is  $15.13^\circ$ . If he is standing  $14\text{ m}$  from the base of this side, how deep is the ravine?  $3.8\text{ m}$
- 8.) As an airplane flying north passes directly over a civil defense air watch unit, another unit  $4.30\text{ km}$  due north finds the angle of elevation of the plane to be  $19.17^\circ$ . Find the altitude of the plane.  $1.50\text{ km}$
- 9.) Find the length of the altitude of an isosceles triangle whose base has length  $20.0\text{ cm}$  and whose base angles each has a measure of  $45^\circ$ .  $10.\text{ cm}$
- 10.) A pendulum  $40.\text{ cm}$  long is moved  $30.^\circ$  from the vertical. How much is the lower end of the pendulum lifted?  $5.4\text{ cm}$

- 11.) The top of a vertical tree broken by the wind hits the ground  $25.0\text{ m}$  from the foot of the tree. If the upper portion makes an angle of  $30.0^\circ$  with the horizontal ground, what was the original height of the tree?  **$43.3\text{ m}$**
- 12.) The angle of elevation of the top of Billings building from the roof of the Wolcott Building (in the same vertical plane) is  $33.10^\circ$ . As well, from the roof of the Wolcott to the 15<sup>th</sup> floor of the Billings building is  $21.50^\circ$ . If the distance between the roof and the 15<sup>th</sup> floor is  $101\text{ m}$ , how far apart are the buildings?  **$392\text{ m}$**
- 13.) From a point on the ground  $75\text{ m}$  from the base of a building, the angle of elevation of the top of a flagpole on the edge of the roof of the building is  $45.20^\circ$  and the angle of elevation of the bottom of the flagpole is  $38.40^\circ$ . Find the height of the pole.  **$16\text{ m}$**
- 14.) How far from the vertical wall of a building is the base of a thirty-foot ladder, which makes a  $75^\circ$  angle with the ground?  **$7.8\text{ ft}$**