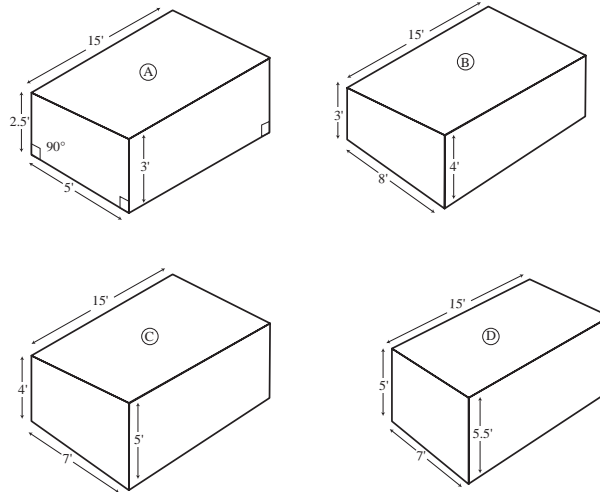
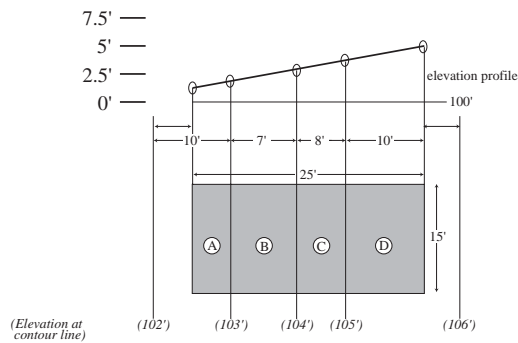


SURVEYING

1. Do the following:
 - a. Determine the height of a tall object (a building, tree, landmark, or other structure). Use a level rod or tape for the surveying tools. Write a report describing how this measurement was made and show your calculations.
 - b. Using triangles, determine the width of a river or other body of water (must be 35 feet or more). Explain how this was done and show your calculations. Prove the answer by using the Pythagorean theorem. Write out the formula and give your answer.
 - c. On a compass walk, complete an azimuth bearing that goes through a large uncrossable obstacle, such as a lake, building, rock outcropping, etc., by using ONE of the following methods. Write a report describing how this measurement was made and show your calculations.
 - i. Use 90 degrees offset (using four-part steps). Use 90 degree increments on a compass and count pace steps to get around the obstacle. Do not use triangles.
 - ii. Use triangulation. Use the compass to do a 45 degree triangle around the obstacle. Show all math and sightings on a chart and place your work in your workbook. Determine how far you would have gone on the original azimuth bearing if you had stayed on a straight path.
 - iii. Use triangulation – 30/60 degree triangle with a compass. Show all math and sightings on a chart and place your work in your workbook. Determine how far you would have gone on the original azimuth bearing if you had stayed on a straight path.
 - d. Stake out an area for pouring a foundation or cement slab. Use both of the following methods to check for squareness (90 degrees) of the corners of the foundation.
 - i. Use a “3, 4, 5” triangular method.
 - ii. Survey with a surveying instrument. Explain what a transit is and how to set it up properly.
 - e. Determine how many cubic yards of dirt are to be removed from the 15-foot by 30-foot landmass that has the contours as shown. The area will have a straight vertical cut, and the final elevation will be at 100 feet. A surveyor needs this information to determine the cost of moving the dirt by dump truck. The surveyor will need to know the cubic yard capacity of the truck in order to determine how many loads would be required. (See drawing.)
 - Six-wheelers have the capacity of approximately 5 to 7 cubic yards.
 - Ten-wheelers have the capacity of 10 to 12 cubic yards or about 13 tons. They are great for getting in and out of tight locations.
 - Twelve-wheelers have the capacity of 12 to 14 cubic yards or about 16 tons. These trucks have higher sides and are also used in hauling green waste and demolition debris.

See Illustration below.



2. Survey a piece of land that is at least $\frac{3}{4}$ acres using both a transit and a GPS (global positioning system) receiver. This survey could be done on a remote piece of land or to verify the accuracy of a previously surveyed property. Locate the corner stakes if surveying a previously surveyed property. Include any other notable principle landmarks. List the tools that were used in this survey. Locate the longitude and latitude information of this land, its elevation and contours, and where it is located. Collect field note information and draw a map to scale, indicating the results.
3. Describe each of the surveyor tools listed and describe how to use it.
 - a. Gunter's chain
 - b. Electronic device
 - c. Theodolite or transit
 - d. Surveying level
4. Explain the following surveying methods.
 - a. Triangulation
 - b. Trilateration
 - c. Traversing
 - d. Global Positioning System
5. Describe at least six different types of surveying methods and the purpose for each type of survey.
6. Interview a licensed surveyor and write a report including the following information.
 - a. The role or purpose of surveyors
 - b. Career opportunities in this profession
 - c. Education preparation for this career