

CHAPTER 3 PROJECT

Using the Pythagorean Theorem

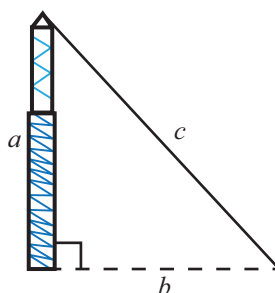


Assume that a company that builds radio towers has hired you to supervise the installation of steel support cables for several newly built structures. Your task is to find the point at which the cables should be secured to the ground. Assume that the cables reach from ground level to the top of each tower. The cables have been precut by a subcontractor and have been labeled for each tower. Finding the correct distance from the base is necessary because each cable must be grounded before being attached to a tower to avoid damaging the equipment by electric shock.

The following is your work list for this week.

Tower Name	Tower Height	Cable Length	Distance from Base
Shelbyville Tower	58 ft	75 ft	_____
Brockton Tower	100 ft	125 ft	_____
Springfield Tower	77 ft	98 ft	_____
Ogdenville Tower	130 ft	170 ft	_____

1. Use the Pythagorean formula ($a^2 + b^2 = c^2$) to determine how far from the base of the towers to attach the cables to the ground.



2. What length of cable would you need for a 150-foot tower if the grounding point has to be 100 feet from the base?
3. You have 400 feet of cable and wish to attach two lengths opposite one another to the top of a tower 200 feet tall, securing both lengths to the ground at a required distance of 75 feet from the tower's base. Do you have enough cable to do so? If so, how much is left after attaching the two cables? If not, you decide in advance to run one length to the top of the tower and use the remaining length of cable on the other side, attaching it to the highest point possible on the tower. How far down from the top would that attachment point be?
4. The tallest radio tower in the United States is in the Oro Valley near Tucson, Arizona. A cable from its top attached to the ground 260 feet from its base is 700 feet long. How tall is the radio tower?