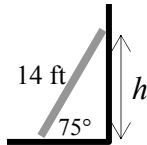


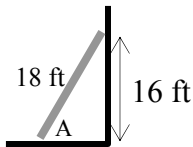
Trigonometry  
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Directions: Unless otherwise indicated, round all answers to the nearest tenth.

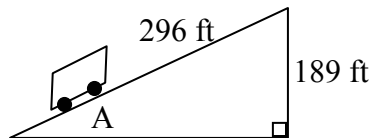
- 1) Determine the height of a tree if an observer stands 45 ft from the base and measures an angle of elevation of  $30^\circ$  when looking at the very top of the tree.
- 2) A portion of a highway has a grade of 7.5%. Convert this grade to an angle.
- 3) To determine the width of a river, a surveyor marks a position directly across from a tree on the edge of the opposite side of the river. He then moves downstream 80 ft from his initial position. When he looks at the tree from the new position, he notes an angle of  $15.8^\circ$ . Use this information to determine the width of the river.
- 4) A ladder is designed to be placed at an angle of  $75^\circ$  from the horizontal. If the ladder is placed against a wall at this angle, how far up the wall will the ladder reach?



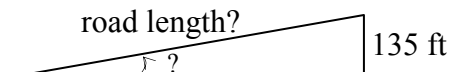
- 5) Is the angle at which this ladder is placed against a wall too steep if the manufacturer recommends a maximum angle of  $70^\circ$ ?



- 6) The Fenelon Place Elevator in Dubuque, IA runs on a set of tracks that is 296 ft long and rises 189 ft from its starting place to the top of the hill. What is the angle of the tracks?

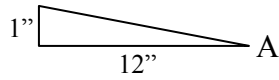


- 7) A temporary logging road is built along the side of a hill that is 135 ft high. According to local regulations the road can have a grade of no more than 8%.
  - a) Convert the 8% grade to an angle (nearest tenth of a degree).
  - b) How long will the road be if it is built to the angle determined in part a) and goes to the very top of the hill?



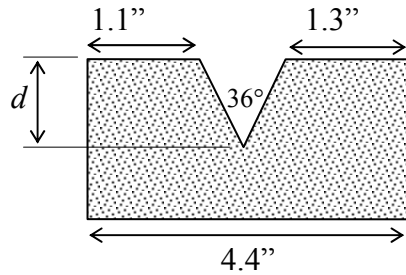
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8) According to the ADA, a ramp meant for use by persons using a hand-powered portable wheelchair can rise 1" for every 12" of horizontal travel. See the diagram below.

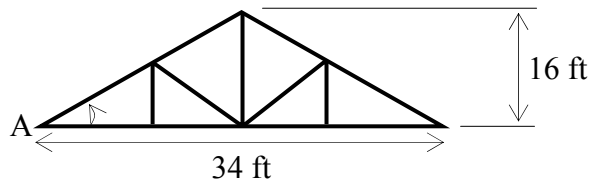


- a) What is the angle of a ramp built to those specifications?
- b) If a ramp is built using the angle found in part a) that must rise a total of 3 ft, how long will the ramp surface be?

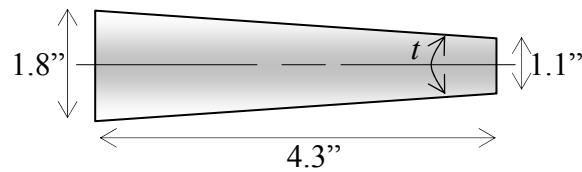
9) Determine the depth of the machined groove in this steel block.



10) Determine the angle shown on this diagram of a rafter.

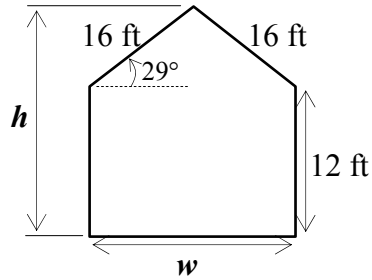


11) Compute taper angle  $t$ .

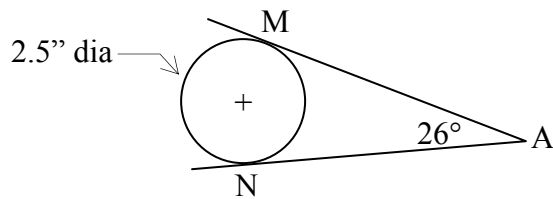


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12) The diagram shows the end view of a house. Calculate the overall height ( $h$ ) and width ( $w$ ) of this house.



13) The 2.5 inch diameter circle shown is tangent to both sides of the  $26^\circ$  angle at points M and N. Determine distance  $NA$ .



14) Compute distance  $x$ .

