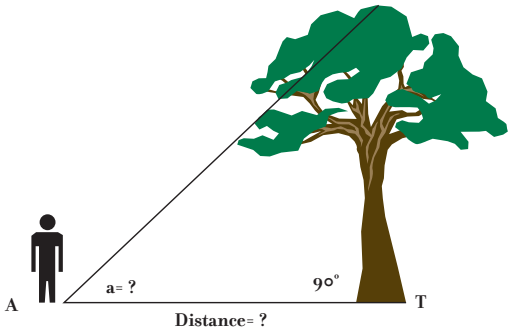
Name(s) _____

HOW TALL?

HANDOUT 3

Materials needed:

- inclinometer
- 25-m tape measure
- pencil
- clipboard
- calculator



MEASURE:

1. Choose a clearly visible tree or other tall object. The base of the object is at Point T.
2. Walk 30 paces away from the tree and establish Point A. *(see illustration)*
3. Use a tape measure to measure Point A to Point T. Enter it in the chart below as Distance (D).
4. Stand at Point A and use the inclinometer to sight the top of the tree through the straw, as if you are looking through a telescope. Hold the inclinometer very still, so that the string with the washer is stationary.
6. Have a group member read the number where the string hangs next to the protractor.
6. Subtract that number from 90. Enter that number in the chart as angle (a).
7. You now have the three numbers you need: one line (D), angle (a), and a second angle at Point T, which is 90° (the right angle between ground and tree). Repeat steps 1-7 for two more objects.

Angle opposite the right angle	Tangent Ratio (T)
30°	.577
35°	.7
40°	.839
45°	1.0
50°	1.088
55°	1.176
60°	1.268
65°	1.364
70°	1.466

CALCULATE:

With any right triangle, the two sides that come together at the right angle have a ratio called a **tangent ratio.** Ratio simply means a comparison between two numbers. It can be written as a decimal. This is part of mathematics called **trigonometry.**

Use this formula to find the height of the objects, **Distance (D) x Tangent Ratio (T) = Height (H)**

HOW TALL? DATA CHART

	Object 1: _____	Object 2: _____	Object 3: _____
Distance (D) _____ m			
Angle opposite the right angle (at Point A) _____ °			
Tangent Ratio (T) (from chart)			
Calculation: D x T = H			
Height (H) _____ m			

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