



Assignment #2

Dear CVG 2171 students,

Please solve the problems below and return them to you TA at the next tutorial session.

- 1- A steel tape when standardized at 68°F and supported throughout its entire length under a tension of 12 lb was found to be 100.012 ft. long. The tape has a cross-sectional area of 0.0078 in² and weighs 0.0266 lb/ft. In the field this tape was used to measure a line from A to B in six segments. It was held horizontal, supported at the ends and the middle point only each time it was used with a constant tension of 17 lb. These segments were recorded as such: 100.000ft, 100.000ft, 100.000ft, 100.000ft, 100.000ft, and 82.366 ft.

What is the actual distance between A and B after corrections for systematic errors have been applied if the temperature of the tape at the time of measurement was 55°F? Coefficient of thermal expansion and contraction of steel is 0.0000065 /ft/°F and its modulus of elasticity is 29×10^6 lb/in².



- 2- A 30-m steel tape measured 29.991 m when standardized fully supported under a 5.500-kg pull at a temperature of 20°C. The tape weighed 1.22 kg and had a cross-sectional area of 0.016 cm². What is the corrected horizontal length of a recorded distance AB for the conditions given in problem below:

Recorded Distance AB (m)	Average Temperature (°C)	Tension (kg)	Means of Support
16.302	25	7.9	Ends Only

- 3- For the conditions given below, determine the horizontal length of CD that must be laid out to achieve required true horizontal distance CD. Assume a 100-ft steel tape will be used, with cross-sectional area 0.025 in², weight 2.4 lb, and standardized at 68°F to be 100.008 ft between end marks when supported throughout with a 12-lb pull (assume horizontal taping and all full tape lengths except the last).

Recorded Horizontal Distance CD (ft)	Average Temperature (°F)	Tension (lb)	Means of Support
97.54	68	12	Throughout

Good luck,