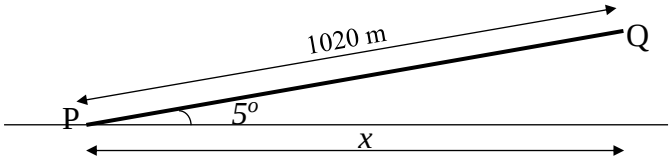
A 100m tape was used to measure a distance between stations P and Q. The recorded slope distance was 1020.00m. The elevation angle measured by a clinometer was 5^o and the standardized length of the tape was 99.98m.

Compute the corrected slope distance and the required horizontal distance PQ.



100 m tape ➔ 1020 m distance

99.98 m tape ➔ ? m distance

corrected slope distance = 99.98 × 1020 / 100 = 1019.796 m

horizontal distance = 1019.796 × cos 5 = 1015.915 m

■■■■

A steel tape of coefficient of expansion 0.0000116 per unit length per °C was used to measure a distance recorded as 600.00m at 40°C, while the standard temp. is 20°C.

Compute the temperature correction and the corrected distance.

$$C_t = C \times L \times (T - T_s)$$

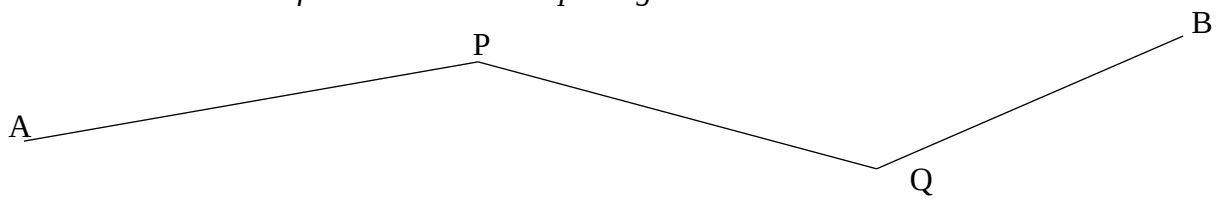
$$C_t = 0.0000116 \times 600 \times (40 - 20) = 0.1392\ m$$

$$corrected\ distance = C_t + L$$

$$corrected\ distance = 0.1392 + 600 = 600.1392\ m$$

■■■■

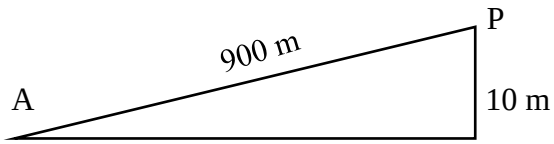
The figure below shows the undulating distance AB divided into three segments. Compute the horizontal distance AB if the standardized tape length is 50.02m.



Measured slope distances: AP=900.00m, PQ=820.00m, QB=600.00m.

Elevation differences are AP=10.00m, PQ=-12.00m, QB=15.00m.

- From A to P:



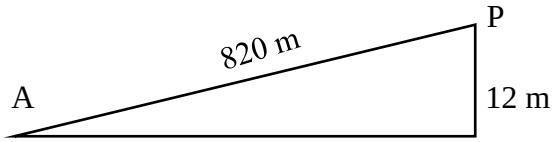
50 m tape ➔ 900 m distance

50.02 m tape ➔ ? m distance

corrected slope distance = 50.02 × 900 / 50 = 900.36 m

$$horizontal\ distance = \sqrt{900.36^2 - 10^2} = 900.3045\ m$$

- From P to Q:



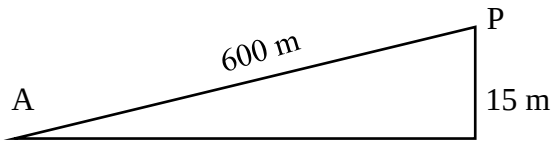
50 m tape ➔ 820 m distance

50.02 m tape ➔ ? m distance

corrected slope distance = 50.02 × 820 / 50 = 820.328 m

$$horizontal\ distance = \sqrt{820.328^2 - 12^2} = 820.2402\ m$$

- From Q to B:



50 m tape ➔ 600 m distance

50.02 m tape ➔ ? m distance

corrected slope distance = 50.02 × 600 / 50 = 600.24 m

$$horizontal\ distance = \sqrt{600.24^2 - 15^2} = 600.0525\ m$$

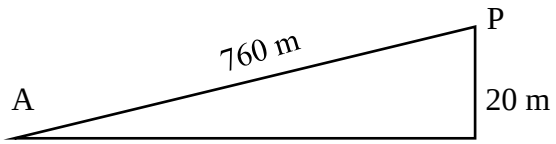
- Total horizontal distance = 900.3045 + 820.2402 + 600.0525 = 2320.5972 m

■■■■

Exam Questing*: A slope distance, AB was measured using a 50m tape and was recorded as 760.00m. if the height difference between A and B is 20.0m and the standardized tape length was found to be 49.92m, compute the corrected horizontal distance AB.*

50 m tape ➔ 760 m distance

49.92 m tape ➔ ? m distance



corrected slope distance = 49.92 × 760 / 50 = 758.784 m

$$horizontal\ distance = \sqrt{758.784^2 - 20^2} = 758.5204\ m$$

■■■■

Exam Questing*: During a steel tape measurement of a distance recorded as 360.800m the outside temperature during measurement was 20°C higher than the standardized temperature, what is the correct distance if steel thermal coefficient of expansion is 11.0x10^{-6} / °C.*

$$C_t = C\ \times L \times (\ T - T_s\ )$$

$$C_t = (11.0 \times 10^{-6})\ \times 360.8 \times 20 = 0.079376\ m$$

$$corrected\ distance = C_t + L$$

$$corrected\ distance = 0.079376 + 360.8 = 360.879376\ m$$

■■■■