



A Vernier-Scale-based Tailor's Tape with Least Count Reduced to 0.005 cm

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Abstract

A prototype of tailor's tape, least count reduced to 0.005 cm, is presented. This is accomplished by making a sliding-Vernier scale, with 20 graduations matched to 19 graduations on the main scale of tailor's tape. Vernier-scale-based tailor's tape is used for measurements of chest circumferences, waist circumferences (indicator of fat content around abdomen) and MUAC (mid-upper-arm circumferences), the last one significant in determining nutritional status. The tape could, also, be used for obtaining hip circumferences (significant in determining over-fat conditions), thigh circumferences and shin circumferences. Engineering tape, made of metallic strip, cannot be used for these measurements, as it could inflict cuts on the skin. Accuracy and precision of this enhanced-Vernier scale is being investigated for measurements of chest circumferences, waist circumferences and mid-upper-arm circumferences. For determining accuracy and precision for measurements performed on a cylinder, diameter of this cylinder is measured to least count of 0.005 cm using Vernier callipers. This diameter is multiplied with π , having a value 3.14159..... ($22/7$ should not be used as value of π), to determine circumference, used in accuracy and precision formulae along with 10 measurements of circumference of cylinder. The accuracy and the precision for cylinder measurements come out to be 99.982% and 98.561%, respectively. Combined with setsquares for height measurement (least count 0.005 cm) and mass measurement (least count 0.005 kg), this Vernier-scale-based tailor's tape completes the triad of enhanced-measurement tools.

Keywords: Accuracy, Chest circumference, Mid-upper-arm circumference (MUAC), Precision, Waist circumference

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