Measuring Steepness

Using metersticks, have participants measure and record the vertical and horizontal distances of at least three geographic areas with objects that have steepness, i.e., steps, handrails, sidewalks, ladders, ramps. Remind participants that the measurements should be read in centimeters (cm). Ask participants to sketch diagrams on overhead transparencies of the objects that they measured and to show the placement of the meter sticks.

If participants are measuring sidewalks or ramps, the best procedure is to find the vertical distance from the ground at a point where the horizontal measurement is 100 cm as shown in Example 1.

After the measurements for each object are recorded, the participants are to complete the table.

Questions for Discussion
- Have groups compare ratios for the same object (ratios will most likely vary). Are the ratios approximately the same for each object?
- What is the steepness of the roof of the school (if the roof is flat) or what is the steepness of a flat roof? (Ans: zero)
- What is the steepness of a wall in the classroom? (Ans: undefined slope because the horizontal distance is zero)
- Predict the steepness of the roof of your home? How would you determine the steepness of the roof of your home?
- What conclusions can be drawn about the ratio of the vertical distance of an object to its horizontal distance?
- Which object is more steep--one in which the vertical measure is greater than the horizontal measure <u>or</u> one in which the vertical measure is less than the horizontal measure? (Ans: one in which the vertical measure is greater than the horizontal measure)

Emphasize Algebra I TEKS, Linear Functions #6
6.g.   The student interprets and predicts the effects of changing slope and y-intercept in applied situations.

MEASURING STEEPNESS

DIRECTIONS: Measure the vertical and horizontal distances of the objects assigned by your teacher. Record your measurements in the appropriate space provided. Then, write the measurements as a ratio (vertical measure/horizontal measure), an equivalent decimal rounded to two places, and a percent.

$$\frac{\text{vertical measure}}{\text{horizontal measure}} = \frac{8}{100}$$

100 cm

100 cm

8 cm

sidewalk
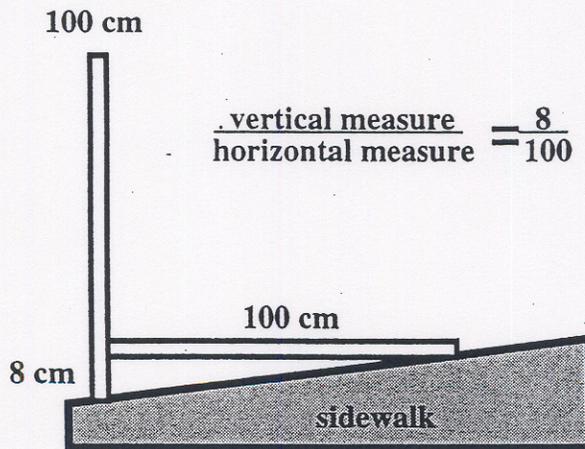
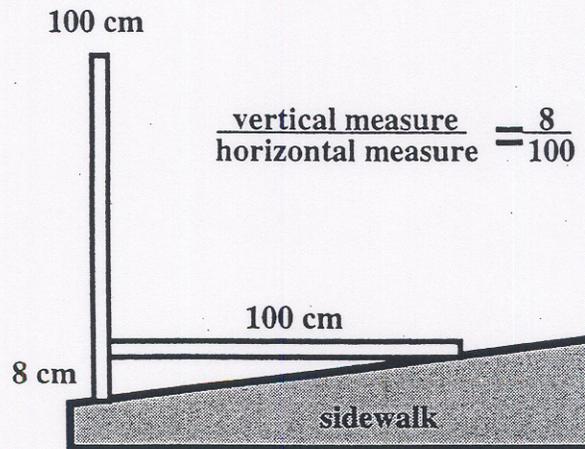| Object	Vertical Measure	Horizontal Measure	Ratio	Decimal	Percent

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