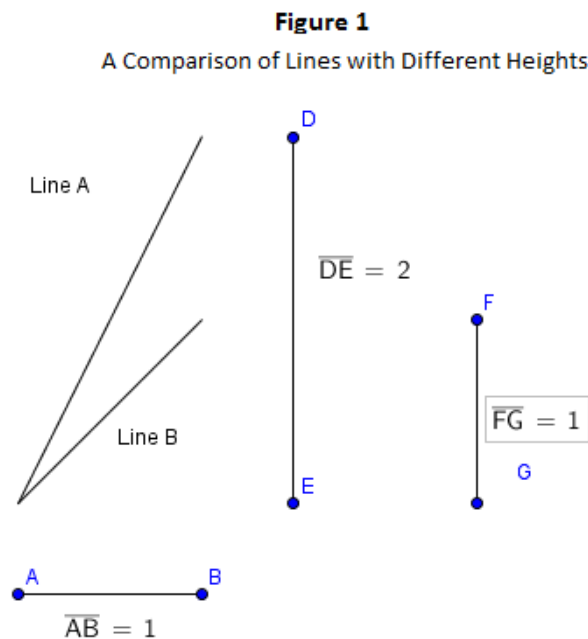


Heretofore being established that a unique straight line connects two points lying in the same plane, we proceed to an investigation of the properties of such lines.

Consider, for example, the two lines depicted in Figure 1. They occupy the same horizontal breadth, yet the line marked Line A traverses considerably more vertical distance than the line marked Line B.

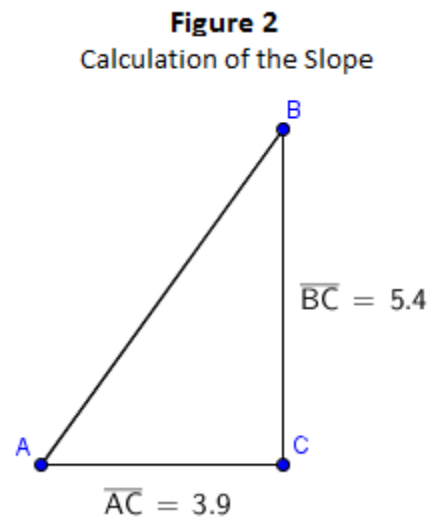


Therefore, we establish as definition the already natural inclination that Line A is steeper than Line B.

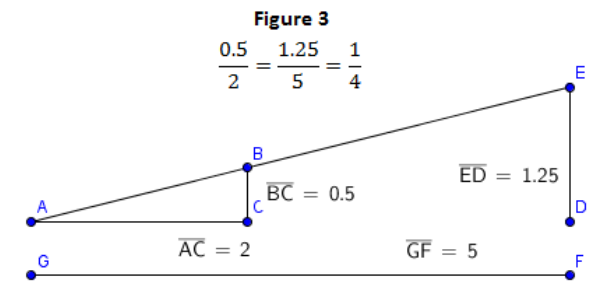
Now any line segment necessarily has both horizontal and vertical measurements, but we desire to reduce “steepness” to a single quantity. Thus, we employ the ratio in manner consistent with previous observation, and we refer to this new calculation as “slope.”

So, referring again to Figure 1, we calculate the slope of Line A as $2/1$, which mathematically reduces simply to 2, and the slope of Line B as $1/1$, which of course is equivalent to 1.

Figure 2 displays a line with non-unit width. Proceeding as advised above, we calculate the slope of Line C as $5.4/3.9$, simplifying to $18/13$, or approximately 1.38.



This definition of slope leads to a very satisfying outcome, as the total length of a line segment, measured along its diagonal, does not affect its slope. Figure 3 shows a line segment with measurements of cumulative height and width made in two different places resulting in the same calculation of slope.



This invariance of the slope calculation to choice of points taken on the line segment is a unique property of lines and key to understanding relationships between linearly-varying quantities.

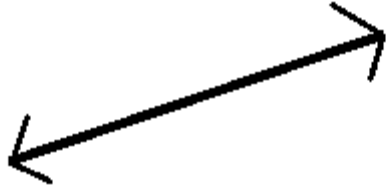
In our next series, we discuss negative slopes, the vertical positioning of a line in reference to fixed axes, and the determination of a unique line based on these two calculations.

Terminology



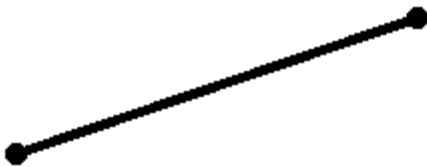
Point

Zero-dimensional object
Usually represented with a circle



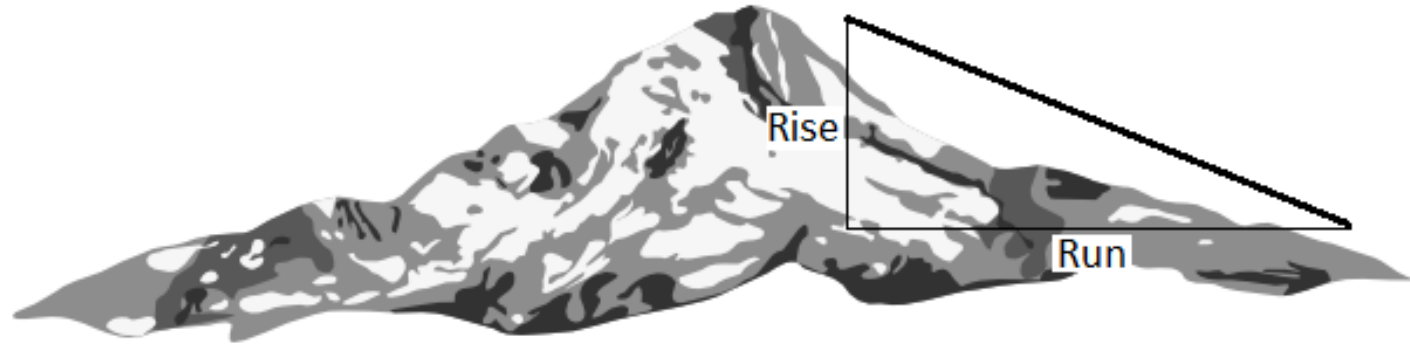
Line

One-dimensional object
Straight
Infinite length, both directions



Line Segment

Straight
Finite Length



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mathematical phenomena,
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Slope

Characteristics and Calculation

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