Chapter 2 Section 2

MA1020 Quantitative Literacy

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Symmetry

Definition

A figure has symmetry if it can be moved in such a way that the resulting figure looks identical to the original figure.

Hard to Define

- "correspondence, equivalence, or identity among constituents of an entity"
- "beauty as a result of balance or harmonious arrangement"
- "mirror-image correspondence between parts of an object"
- "balance, similarity, and repetition"

Types of Symmetry

- reflection symmetry
- rotation symmetry
- translation symmetry

Definition

A rigid motion, or isometry, is any combination of translations, reflections across lines, and/or rotations around a point.

Reflection With Respect to a Line

- image
- If A is a point of reflection line l, then $A = A'$.
- If A is not on line l, then l is the perpendicular bisector of $\overline{AA'}$.

Translation

Definition

A vector is a line segment for which one end of the segment is the beginning point and the other is the ending point.

Definition

Two vectors are equivalent if they are parallel, have the same length, and point in the same direction.

Definition

A translation by a vector v assigns to every point A in a plane, an image point A', where the vector with beginning point A and ending point A' is equivalent to v.

Rotation

Definition

A directed angle is an angle in which one side is identified as the initial side, and the second side is the terminal side.

Definition

A rotation is determined by the center of rotation O and a directed angle.

Glide Reflection

Definition

A glide reflection is the result of a reflection with respect to a line l followed by a translation determined by a vector v, where l must not be perpendicular to v.

M. C. Escher