Transcript for ASL interpretation

Note: slides 62, 63, 94, 95 are dense in math expressions.

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Today I’m presenting excerpts from my ongoing text project titled A First Course in Figurative Painting.

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A painting manual written in the language of modern math.

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Parts.

One. Sample text with chapters one and two.

Physical copies are on the table in person.

PDF at link in Zoom chat.

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Two. Front and back cover.

Printed and displayed on the wall in person.

Included in the PDF.

6

Three. Slideshow presentation of highlights from chapters 1 through 4 of the text.

On the Zoom call.

Slideshow and transcript at link in Zoom chat.

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Highlights.

Content warning: violent and sexual content.

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Front and back cover.

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A First Course in Figure Painting was the first text the collect and organize the fragmented movement of figuration in the mid-twentieth century.

It presents, instead of a historical account of the movement, a self-contained outline of the mathematical constructions that played a key role in the foundational theory and practice of what became known as the field of figurative painting.

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It boasts the inclusion of over 600 figures to the originally unillustrated text, and solutions to selected exercises, offering a more suitable introductory text for freshmen in figurative painting than its previous printings.

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Preface.

One. Prerequisites to this text are reading in English and readiness to learn new vocabulary.

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Two. Examples of what symbols, nouns, and adjectives look like in the text.

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Subset of or equal to.

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Union.

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Intersection.

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Empty set.

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The set of natural numbers.

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The set of rational numbers.

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The set of real numbers.

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The three-dimensional Euclidean space.

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The n-dimensional Euclidean space.

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The open ball of radius r around point p.

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Function f from domain X to codomain Y.

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Equivalence relation.

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Metric.

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Subspace.

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Star-convex.

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Injective.

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Surjective.

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Bijective.

31

Finite.

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Countably infinite.

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Uncountable.

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Three. Some describe the reading experience as reading a detective novel in French while learning French.

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Four. Before Renaissance, math is divided into two branches: Arithmetic and Geometry.

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Five. Today's classification system name ninety-eight branches of math.

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Six. This text uses undergraduate level material in branches dealing with spatial properties, namely

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Differential geometry, general topology, and manifolds and cell complexes.

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Seven. Modern math is characterized by generality,

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Favoring abstract definitions and statements that extend to arbitrary dimensions and sizes.

41

Example of generality in a definition. The standard metric on R n encapsulates the concept of distance between two points in n-dimensional space.

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The concept is defined for any natural number n, not just for dimensions one, two, and three which we are familiar with.

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Eight. Generality gives deeper insight into structures, simpler presentation of material, and minimal duplication of effort.

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Nine. Modern math texts make assumptions clear by following the structure of definition, axiom, proposition, proof.

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Ten. What objects to define, which axioms to accept, and which logical rules to go by are all assumptions.

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Eleven. Which assumptions to make is an aesthetic choice of the practitioner.

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Twelve. This text provides figures illustrating low-dimensional and finite cases of every concept.

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Example. The standard metric on n-dimensional Euclidean space can't be drawn for n greater than three.

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The case of n equals two can be drawn easily since the space is flat.

50

In the topologist’s earring figure, an infinite number of circles can’t be drawn and are replaced by ellipses.

51

Chapter one. Sets, relations, and functions.

Fundamental definitions used in all of math, such as

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Set intersection.

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Set difference.

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Chapter two. Metrics and topologies.

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Open ball.

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S one.

57

S two.

58

Hedgehog space.

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Exercises. Two point one.

This problem asks you to make an infinite number of drawings, each with a different number of lines through a point, on the most general space possible for the task.

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A partial solution is in the back of the book.

61

Chapter three. Anatomy.

Definitions used to describe figures, with examples.

62

Stick-figure spaces.

Let n be a natural number. Define the n-mother axial skeleton Omega n as the wedge sum of S n and the closed interval from zero to infinity in the reals, where the S n component is called the head of the n-mother.

The figure below shows the case when the head is S one.

63

Given a subset big A in Q, define the mother A-appendicular skeleton psi A as a collection of trees psi little a theta for all little a in big A, and theta in the closed interval from zero to two pi intersect Q.

The quotient space Omega n disjoint union psi big A mod tilde is called the n-mother big-A-stick-figure space, where little a is equivalent to psi b theta if and only if little a equals b for all little a, b in big A.

64

A figure illustrating the n-mother-A-stick-figure space.

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A stick figure space is any subspace of the mother stick-figure space. Examples.

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This definition is sometimes dissatisfactory, because:

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One. It suggests that each stick-figure is a part of a certain definite whole.

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Two. It doesn't account for stick-figures with multiple heads. For example.

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In rare cases, stick-figures can have symmetries. Reflectional, or bilateral.

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Radial.

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The definition of stick-figure spaces can be extended to 2D figure spaces with its boundary, or skin, enclosing an inside,

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like making fonts bold.

78

Similarly, we can extend the 2D figure space definition to define 3D figure spaces.

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The boundary of a 2D figure is made of lines.

The boundary of a 3D figure is a 2D surface.

80

Chapter bonus.

An uncommon variant of the stick-figure space called the snow-figure space.

81

Chapter 4. Surfaces and vector fields.

One. 3D figure spaces are among the most common subjects of figurative painting.

82

Two. By the classification theorem, any surface of a closed figure is a connected sum of these surfaces:

Sphere, torus, projective plane, and klein bottle.

83

Illustration of the operation of connected sum.

84

Chapter four. Surfaces and vector fields.

Three. Classification, sums, and decompositions of surfaces determine the mode of abstraction in figurative painting.

85

Triangulation is an example of surface decomposition.

86

Three. Vector fields on surfaces determine the modes of markmaking in figurative painting.

87

Examples of vector fields on surfaces.

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Chapter five. Operations on figure spaces.

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Aside from triangulation, there are many classes of figure decompositions. For example,

91

Kinbaku theory studies figure decompositions given by graph embeddings on surfaces.

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Other common decompositions:

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Flaying.

Fracture.

94

If a stick-figure X is not headless. I.e. O equals p where p is a single point, then a decomposition of X is called a decapitation if the interval from C naught to C one in R is not connected.

The figure shows a decapitation of a bilateral H one symmetric double-story one-stick-figure.

95

A decomposition of a connected figure space X is a quartering if it consists of exactly four connected components, U one through U four, where X is the union of U one through U four.

Furthermore, the decomposition is a regular quartering if U i equals U j for all i and j from one to four.

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Remark. Many constructions are named after real-life practices, though not all practices correspond to math definitions.

Example. Mummification.

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This is the end of my presentation. Thank you.