MASTER STRUCTURE OF TRANSFERABLE CONCEPTS FOR MATHEMATICS

KEY: SLASH: major synonyms   SEQUENCE LETTERS: A before B before C, etc.
      COMMA: closely linked, synergistic concepts   capitals indicate an essential concept
      BULLET: other synonyms and common associations   lower case indicates could be skipped
                                          same letter indicates that order doesn't matter

BASIC CONCEPT	SUB-CONCEPT	SUB-SUB-CONCEPT
NUMBER A • integer	NUMBER LINE/CONTINUUM A	
	PLACE VALUE B	
	EQUIVALENCE OF NUMBER C • Notation – Roman, standard, scientific	FACTOR, MULTIPLE, PRIME A
MEASUREMENT A • length, area, volume, radius, diameter, etc	PROPERTY /VARIABLE A • observation • symbol & substitution • numerical vs. non-numerical properties	VALUE, UNIT A • absolute value • rational, irrational, complex numbers • unit conversion, dimensional analysis
		ESTIMATE b • accuracy, error • rounding, precision
	GRAPHIC ORGANIZER B • chart • circle-, bar-, line-graph	
OPERATION A • add, subtract, multiply, divide • sum, difference, product, quotient, net, gross, interval • exponent, root	EXPRESSION, TERM A • evaluating expressions	ALGORITHM a • Properties of speed, efficiency, sensitivity, accuracy, robustness
	INVERSE, IDENTITY OPERATIONS B	
	ASSOCIATIVE, COMMUTATIVE LAWS B	
	DISTRIBUTIVE LAW C • order of operation: parentheses, (+,-) before (x, ÷) • FOIL, factoring • difference of squares • perfect square trinomial	

BASIC CONCEPT	SUB-CONCEPT	SUB-SUB-CONCEPT
PATTERN/REGULARITY b • continuous, chronic, sporadic, intermittent	ORDER/SEQUENCE A	
	REPETITION A • recursive, iterative patterns	
	RELATIONSHIP, INTERVAL B • progression	
	NOISE c	
RATIO B • part-to-whole • fractions • comparison by division	PERCENTAGE A	
	PROPORTION A • scale factor	
GRAPH B • coordinate system • domain, range • segment mid-point, length	SLOPE A • maximum, minimum slope • inflection point	RATE A • change over time
	INTERSECTION A • x-, y-intercept	
	SUBTENDED AREA, ACCUMULATION b	
	TREND LINE c • interpolation, extrapolation • curve fitting	
CHANGE b • process, event • input, output	RATE A • change over time	
	CORRELATION, CAUSALITY b • direct, inverse correlation	
EQUATION C • algebraic transformation, simplification • re-arranging equations • language of science	LINE, CURVE, POLYNOMIAL A • linear & non-linear equations • solving quadratics	
	EQUATION SYSTEMS b • linear programming • simultaneous equations • operating with polynomials	
	RELATION, FUNCTION c • trigonometric functions, identities, laws	

BASIC CONCEPT	SUB-CONCEPT	SUB-SUB-CONCEPT
SHAPE/CONFIGURATION C • polygons • 1, 2, 3-dimensions • length → line • area → surface • volume → space	ORIENTATION A • parallel, perpendicular • vertical, horizontal	DIRECTION A • radian measure • polar coordinate
		VECTOR b
		PHASE SHIFT b
	REPRESENTATION A • visualization • net • vertex-edge diagram	SECTION a
		SHADOW, MAPPING a
		PROJECTION a
		PERSPECTIVE a
	ANGLE B • vertex • right, acute, obtuse	COMPLIMENTARY, SUPPLEMENTARY, CONGRUENT ANGLES A • vertical angles
		TRIANGLE A • isosceles, equilateral, right • Pythagorean theorem • sine, cosine, tangent
		CIRCLE B • chord, arc, tangent, secant • central, inscribed, tangent-chord-secant angles
	SYMMETRY b • bi-lateral, radial • self-congruence	CONGRUENCE, SIMILARITY A
		GEOMETRIC TRANSFORMATION b • translation, reflection, rotation, dilation, shear
		TESSALATION, TILING, SPACE FILLING b

BASIC CONCEPT	SUB-CONCEPT	SUB-SUB-CONCEPT
DATA D • data representation • types of data (continuous, discrete, etc) • range, spread	AVERAGE/CENTRAL TENDENCY A • mean, median, mode • center/location • statistics	
	VARIABILITY b • accuracy, error • resolution	DISTRIBUTION a • percentile, quartile distribution • normal distribution • deviation, outlier
	CORRELATION, CAUSALITY b • direct, inverse • accelerated • converging • cyclical • stepped	CHI-SQUARE a
		REGRESSION b
	COMBINATION, PERMUTATION c • Pascal's triangle	
	SAMPLE c	
PROBABILITY/CHANCE E • randomness • sample space, event • tree diagram • odds	COMPOUND PROBABILITY a	
	CONDITIONAL PROBABILITY a	
INFINITY e	SEQUENCE, SERIES a	
	LIMIT a	