GEOMETRY

Numbers and Operations Standard: 1 Understands and applies concepts of numbers and operations				
Power Benchmark 1: Understands numbers, ways of representing numbers, relationships among numbers, and number systems.				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Simplifies expressions involving radicals ITED * ACT SAT ASVAB	• Radical • Exact form • Approximate form • Perfect-square factors • Square root • Like/unlike radical • Negative square root • Rationalize denominators	• Knows $\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$ • Knows $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ • Knows the distributive property can be used to combine radicals • Knows how to rationalize denominators	• Writes radicals in simplest form (ITED, ACT, SAT) • Express radicals in exact form and approximate form - • Performs mathematical operations with radicals (ACT, SAT, ASVAB) • Solves simple problems involving radicals, such as Pythagorean Theorem, Midpoint Theorem, Distance Formula, Trigonometric ratios (ITED, ACT, SAT)	

Algebra Standard: 2 Understands and applies concepts of algebra and functions				
Power Benchmark 2: Represents and analyzes mathematical situations and structures using algebraic symbols				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Recognizes patterns and relationships	• Patterns • Rule • Inductive reasoning • Conjecture • Counterexample	• Identifies and extends patterns • Uses a variety of formats to represent patterns	• Recognizes operations used in a pattern - • Identifies rules that describe number patterns -	

Geometry Standard: 3 Understands and applies concepts of geometry				
Power Benchmark 1: Analyzes characteristics and properties of two- and three-dimensional geometric shapes and develops mathematical arguments about geometric relationships				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Describes figures by their properties ACT	• Polygon • Regular polygon • Triangle • Scalene • Isosceles • Equilateral • Equiangular • Right triangle • Hypotenuse • Leg • Obtuse triangle • Acute triangle • Convex • Concave • Circle • Quadrilateral • Parallelogram • Rhombus • Kite • Rectangle • Square • Trapezoid • Cone • Cylinder • Prism • Pyramid • Sphere • Diagonal • Altitude • Median	• Knows the properties of polygons, prisms, cylinders, & circles	• Describes geometric figures using their properties - • Classifies figures by their discrete properties (ACT)	

Geometry Standard: 3 Understands and applies concepts of geometry				
Power Benchmark 1: Analyzes characteristics and properties of two- and three-dimensional geometric shapes and develops mathematical arguments about geometric relationships (con't)				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
b. Describes relationships between figures using properties of lines	• Point • Endpoint • Line • Segment • Ray • Plane • Parallel lines • Perpendicular lines • Skew lines • Intersecting Lines • Bisectors • Midpoint • Collinear • Coplanar • Distance formula • Midpoint formula	• Knows properties of line segments • Knows the midpoint of a line segment divides the line into two equal parts • Knows how to find the slope of a line • Knows how to graph a linear equation	• Uses properties of lines to describe relationships between figures - • Uses distance formula - • Uses midpoint formula - • Uses slope to determine whether lines are parallel, perpendicular, or neither -	

Geometry Standard: 3 Understands and applies concepts of geometry				
Power Benchmark 1: Analyzes characteristics and properties of two- and three-dimensional geometric shapes and develops mathematical arguments about geometric relationships (con't)				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
c. Describes relationships between figures using properties of angles and sides ACT	• Vertical angles • Adjacent angles • Complementary angles • Supplementary angles • Right angles • Parallel lines • Transversal • Interior angle • Exterior angle • Corresponding angles • Alternate interior angles • Vertex	• Knows the properties of angles • Understands the relationship of angles when two parallel lines are cut by a transversal	• Uses properties of angles to describe relationships between figures (ACT)	
d. Describes relationships among figures using congruence and similarity ACT	• Congruent • Similar • Corresponding parts • Proportionality • Similar figures • Congruent figures	• Knows the properties of congruent and similar figures • Knows the difference between similarity and congruence • Knows the ratios of pairs of corresponding sides of similar triangles are equivalent	• Recognizes figures as congruent and similar - • Uses proportionality to show similarity (ACT)	

Geometry Standard: 3 Understands and applies concepts of geometry				
Power Benchmark 2: Specifies locations and describes spatial relationships using coordinate geometry and other representational systems				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Demonstrates how geometric relationships correspond directly to algebraic concepts using the coordinate plane ACT SAT	• Coordinate plane • Midsegment • Distance formula • Midpoint formula • Slope formula	• Knows the formulas for distance, midpoint, and slope	• Uses the distance and midpoint formulas correctly - • Uses the distance and slope formulas to classify quadrilaterals -	

Power Benchmark 3: Applies transformations and uses symmetry to analyze mathematical situations				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Describes transformations using various representations	• Transformation • Image • Preimage • Isometry • Orientation • Translation • Composition • Rotation • Reflection • Dilation • Vector	• Knows the difference between the types of transformations	• Represents transformations using sketches, coordinates, vectors and matrices -	

Geometry Standard: Understands and applies concepts of geometry				
Power Benchmark 3: Applies transformations and uses symmetry to analyze mathematical situations (con't)				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
b. Describes figures in terms of their symmetry	• Symmetry • Reflectional symmetry • Rotational symmetry • Point symmetry	• Knows the difference among types of symmetry	• Identifies the types of symmetry in a figure -	

Power Benchmark 4: Uses visualization, spatial reasoning, and geometric modeling to solve problems				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Builds logical reasoning skills using proofs	• Conjecture • Proof • Theorem • Corollary • Postulate • Inductive reasoning • Deductive reasoning • Hypothesis • Conclusion • Conditional • Converse • Biconditional • Negation • Inverse • Contrapositive • Two-column proof • Paragraph proof • Indirect proof • Flow proof • Coordinate proof	• Knows relevant definitions, theorems and postulates	• Uses inductive and deductive reasoning to verify relationships - • Uses proofs to write convincing arguments - • Establishes the validity of conjectures -	

Geometry Standard: 3 Understands and applies concepts of geometry				
Power Benchmark 4: Uses visualization, spatial reasoning, and geometric modeling to solve problems (con't)				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
b. Applies formulas for perimeter, area, and volume to various 2D and 3D figures ITED*** ACT SAT	• Perimeter • Circumference • Area • Surface area • Lateral area • Base area • Volume • Composite figure • Base • Altitude • Height • Slant height • Edge • Apothem	• Knows the formulas for perimeter, area, surface area, and volume	• Computes the perimeter of various figures (ITED-rectangle only, SAT) • Computes the circumference of a circle (ITED, ACT, SAT) • Computes the area of various figures (ITED-rectangle only, ACT, SAT) • Computes the volume of various figures (ITED-rectangle only, ACT, SAT) • Finds area of regular polygons -	
c. Proves and verifies relationships using properties of triangles ITED* ACT	• Pythagorean Theorem • 30-60-90 triangle • 45-45-90 triangle • Right triangle	• Knows the Pythagorean Theorem • Knows the properties of special triangles	• Applies Pythagorean Theorem & its converse to find segment lengths (ITED, ACT) • Applies Pythagorean Theorem & its converse to find segment lengths (ACT)	
d. Proves and verifies relationships using properties of triangles ACT	• Trigonometry • Sine • Cosine • Tangent • Inverse sine • Inverse cosine • Inverse tangent • Vector • Angle of elevation • Angle of depression		• Determines the appropriate trigonometric ratio for a specific problem (ACT) • Uses trigonometric ratios to find segment lengths and angle measurements (ACT)	

Data Analysis and Probability Standard: 5 Understands and applies concepts of data analysis and probability				
Power Benchmark 4: Understands and applies concepts of probability				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Uses geometric models to find the probability of events ITED ACT SAT	• Geometric probability • Favorable outcomes • Possible outcomes	• Knows the probability of event = (# of favorable outcomes/ # of possible outcomes)	• Uses a model to compute the geometric probability of an event	

Problem Solving Standard: 6 Understands and applies problem solving strategies				
Power Benchmark 1: Uses a variety of strategies to solve problems				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Applies and adapts a variety of appropriate strategies to solve problems	•	• Solves equations proficiently	• Draws appropriate diagrams • Sets up the problem • Accurately solves the problem • Tests validity of the solution	

Measurement Standard: 4 Understand and apply concepts of measurement				
Power Benchmark 2: Applies appropriate techniques, tools and formulas to determine measurements				
Course Level Benchmark	**Vocabulary**	**Background Knowledge/Prior Skills**	**Skills to Assess**	
a. Selects and applies appropriate formulas for perimeter, area and volume for various 2D figures and 3D solids	• Perimeter • Circumference • Area • Surface area • Lateral area • Base area • Volume • Base • Altitude • Height • Slant height • Edge • Apothem	• Knows the formulas for perimeter, area, lateral area, base area, surface area, and volume	• Computes the perimeter of various figures (ITED, SAT) • Computes the circumference of a circle (ITED, ACT, SAT) • Computes the area of various figures (ITED, ACT, SAT) • Computes the volume of various solids (ITED, ACT, SAT) • Finds area of regular polygons	