Expectations

1.1 The student will represent functions and relations numerically, graphically, and algebraically.

1.4 The student will use numerical, algebraic, and graphical representations of functions and relations in order to solve real-world problems

2.1 The student will analyze two- and three-dimensional figures using tools and technology when appropriate.

2.2 The student will apply geometric properties and relationships to solve problems using tools and technology when appropriate.

4.1 The student will describe and represent numbers and their relationships.

4.2 The student will estimate and compute using mental strategies, paper and pencil, and technology.

Indicators

1.1.PC.4 write equivalent forms for rectangular and polar equations.

1.1.PC.5 write equivalent equations for functions and relations in parametric and rectangular form.

1.1.PC.6 write a vector equation of a line in 2-space.

1.1.PC.7 write an equation of a line or plane in 3-space.

1.1.PC.9 represent parametric functions and relations numerically, algebraically, and graphically.

1.1.PC.13 graph polar equations and describe their properties.

.1.PC.14 graph a point, line, or plane in 3-space.

1.4.PC.6 solve systems of equations in polar form.

1.4.PC.11 interpret and solve problems involving parametric functions and relations.

2.1.PC.1 write equivalent rectangular and polar forms of points on the coordinate plane.

2.1.PC.2 represent a vector in 2-space by its magnitude and direction, its initial and terminal points, and its component form.

2.1.PC.3 represent a vector in 3-space by its magnitude and direction, its initial and terminal points, and its component form.

2.1.PC.6 determine multiple polar form representations of a point.

2.1.PC.7 identify the pole and the polar axis, and plot points given in polar form.

2.2.PC.2 determine the distance from a point to a line in 2-space.

4.1.PC.1 write equivalent rectangular and polar forms for complex numbers.

4.1.PC.2 represent complex numbers in polar form numerically and graphically.

4.2.PC.1 determine the product or quotient of two complex numbers in polar form.

4.2.PC.2 determine a power or the roots of a complex number using DeMoivre's Theorem.

4.2.PC.3 determine the sum, difference, scalar product, and dot product of vectors in 2-space.

4.2.PC.4 determine the sum, difference, scalar product, dot product, and cross product of vectors in 3-space.

Essential Questions

Why are functions and relations represented by vectors?

Why are functions and relations represented by parametric equations?

Why are functions and relations represented by polar coordinates?

Enduring Understandings

Functions and relations can be represented using vectors, parametric equations, and polar coordinates.

Vectors, parametric equations, and polar coordinates are useful in solving real-world problems.