

High School -- Precalculus

Reasoning with Functions and Relations (RFR)

A Analyze Functions (Standards within this strand encompass P.F-IF) RFR.AF

- 1 Interpret parameters of a function defined by an expression in the context of the situation. RFR.AF.1
- 2 Sketch the graph of a function that models a relationship between two quantities, identifying key features. RFR.AF.2
- 3 Interpret key features of graphs and tables for a function that models a relationship between two quantities in terms of the quantities. RFR.AF.3
- 4 Use limits to describe long-range behavior, asymptotic behavior, and points of discontinuity. RFR.AF.4
- 5 Sketch the graph of all six trigonometric functions, identifying key features. RFR.AF.5

B Building Functions (Standards within this strand encompass P.F-BF, P.F-TF) RFR.BF

- 1 Model relationships between quantities that require adding, subtracting, multiplying, and/or dividing functions RFR.BF.1
- 2 Model relationships through composition and attend to the restrictions of the domain. RFR.BF.2
- 3 Rewrite a function as a composition of functions. RFR.BF.3
- 4 Determine if a function has an inverse. If so, find the inverse. If not, define a restriction on the domain that meets the requirement for invertibility and find the inverse on the restricted domain. RFR.BF.4
- 5 Interpret the meanings of quantities involving functions and their inverses. RFR.BF.5
- 6 Verify by analytical methods that one function is the inverse of another. RFR.BF.6

C Interpreting Conics (Standards within this strand encompass P.G-GPE) RFR.IC

- 1 Model real-world situations which involve conic sections. RFR.IC.1
- 2 Identify key features of conic sections (foci, directrix, radii, axes, asymptotes, center) graphically and algebraically. RFR.IC.2
- 3 Sketch a graph of a conic section using its key features. RFR.IC.3
- 4 Use the key features of a conic section to write its equation. RFR.IC.4
- 5 Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, determine if the equation is a circle, ellipse, parabola, or hyperbola. RFR.IC.5

D Interpreting Sequences and Series (Standards within this strand encompass P.F-BF.A.2, P.A-SSE.B.4)) **RFR.ISS**

- 1 Model real-world situations involving sequences or series using recursive and/or explicit definitions. **RFR.ISS.1**
 - 2 Use covariational reasoning to describe sequences and series. **RFR.ISS.2**
 - 3 Represent finite or infinite series using sigma notation. **RFR.ISS.3**
 - 4 Find the sums of finite or infinite series, if they exist. **RFR.ISS.4**
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**Reasoning with
Trigonometry**

A Extended Triangle Trigonometry (Standards within this strand encompass P.G-SRT, P.F-TF.B) **RT.ETT**

- 1 Model real-world situations involving trigonometry. **RFR.ETT.1**
 - 2 Apply the Law of Sines and Law of Cosines to solve problems. **RFR.ETT.2**
 - 3 Use trigonometry to find the area of triangles. **RFR.ETT.3**
 - 4 Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x , where x is any real number. **RFR.ETT.4**
 - 5 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. **RFR.ETT.5**
 - 6 Use inverse functions to solve trigonometric equations utilizing real world context; evaluate the solution and interpret them in terms of context. **RFR.ETT.6**
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B Reasoning with Trigonometric Structure (Standards within this strand encompass P.F-TF.C) **RT.RTS**

- 1 Use the structure of a trigonometric expression to identify ways to rewrite it. **RT.RTS.1**
 - 2 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **RT.RTS.2**
 - 3 Solve trigonometric equations. **RT.RTS.3**
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C Exploring Polar Equations **RT.EPE**

- 1 Graph polar equations. **RT.EPE.1**
 - 2 Analyze and interpret the graphs of polar equations. **RT.EPE.2**
 - 3 Use polar equations to solve problems. **RT.EPE.3**
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Reasoning with Vectors

A Modeling with Parametrics RV.MP

- 1 Model real-world contexts with parametric equations. RV.MP.1
 - 2 Use parametric equations to solve problems. RV.MP.2
 - 3 Graph parametric equations and identify orientation. RV.MP.3
 - 4 Analyze and interpret the graphs of parametric equations. RV.MP.4
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B Exploring Vectors RV.EV

- 1 Recognize vector quantities as having both magnitude and direction. RV.EV.1
 - 2 Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes. RV.EV.2
 - 3 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. RV.EV.3
 - 4 Solve problems involving velocity and other quantities that can be represented by vectors. RV.EV.4
 - 5 Add and subtract vectors, and multiply a vector by a scalar. RV.EV.5
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Reasoning with Matrices

A Using Matrices (Standards within this strand encompass P.N-VM.C) RM.UM

- 1 Use matrices to represent and manipulate data. RM.UM.1
- 2 Use matrix operations to solve problems. Add, subtract, and multiply matrices of appropriate dimensions. Multiply matrices by scalars to produce new matrices. RM.UM.2
- 3 Find the inverse and determinant of a matrix. RM.UM.3
- 4 Use matrices to solve systems of linear equations. RM.UM.4