

Functions, Statistics, and Trigonometry

September 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
CEQ: <ul style="list-style-type: none"> • What relationships exist between various functions, their graphs and their solution(s)? • What are the trigonometric functions and how are they used? • How does probability and the use of random variables aid in inference? • How do we effectively interpret information from graphical and numerical displays and summaries? • What conclusions can be made when working with statistics? 				

September

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: <ul style="list-style-type: none"> • How do we describe functions and how can we use them in real life? 	A. Functions & Models A1. Identify domain and range of a function, understand and solve	LT1: I can identify the domain and range of a function.		

<ul style="list-style-type: none"> • How do we model exponential growth and decay? • What does the graph of a quadratic function look like and how do we model quadratic situations? • How do we model inverse variation and what is the constant of proportionality? <p>A. Functions & Models</p> <p>A1. Language of Functions</p> <p>A2. Exponential Functions</p> <p>A3. Exponential Models</p> <p>A4. Quadratic Models</p> <p>A5. Inverse Variation Models</p> <p>UEQ:</p> <ul style="list-style-type: none"> • How do we analyze transformations of graphs? • How does transforming a graph affect the parent function? <p>B. Transformations of Graphs</p>	<p>problems using function notation.</p> <p>A2. Describe properties of exponential functions and identify growth/decay factors and create exponential functions from word problems.</p> <p>A3. Construct mathematical models from exponential situations and compute an exponential equation given two points.</p> <p>A4. Describe properties of quadratic functions and compute and interpret regression models.</p> <p>A5. Describe properties of inverse variation functions and compute the constant of proportionality given an inverse variation coordinate.</p> <p>B. Transformations of Graphs</p> <p>B1. Recognize functions and their</p>	<p>LT2: I can understand and solve problems using function notation.</p> <p>LT3: I can describe properties of exponential functions.</p> <p>LT4: I can identify growth/decay factors and create exponential functions from word problems.</p> <p>LT5: I can construct mathematical models from exponential situations.</p> <p>LT6: I can compute an exponential equation given two points.</p> <p>LT7: I can describe properties of quadratic functions.</p> <p>LT8: I can compute and interpret regression models.</p> <p>LT9: I can describe properties of inverse variation functions.</p> <p>LT10: I can compute the constant of proportionality given an inverse variation coordinate.</p> <p>LT1: I can recognize functions and their properties given a graph.</p>	<p>CSA: A1 - A5 Chapter 2 Test</p> <p>CFA: B1-B3 3.1-3.4 Quiz</p>	
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<p>B1. Graphs of Parent Functions</p> <p>B2. The Graph-Translation Theorem</p> <p>B3. Symmetries of Graphs</p> <p>B4. The Graph Scale-Change Theorem</p> <p>B5. Scale Changes and Translations</p>	<p>properties given a graph and be able to use an appropriate window for graph on a calculator.</p> <p>B2: Describe the effects of translations on functions and graphs and create/identify graphs given a translation.</p> <p>B3. Describe and identify symmetries and asymptotes, recognize functions and their properties given a graph.</p> <p>B4. Describe scale changes of a graph and apply the Graph Scale-Change Theorem in order to create/identify graphs.</p> <p>B5. Describe transformations of graphs and create new functions given transformations.</p>	<p>LT2: I can use an appropriate window for a graph on a calculator.</p> <p>LT3: I can describe the effects of translations on functions and graphs.</p> <p>LT4: I can create and identify graphs given a translation.</p> <p>LT5: I can describe and identify symmetries and asymptotes of graphs.</p> <p>LT6: I can recognize functions and their properties given a graph.</p> <p>LT7: I can describe scale changes of a graph.</p> <p>LT8: I can apply the Graph Scale-Change Theorem in order to create/identify graphs.</p> <p>LT9: I can describe transformations of graphs.</p> <p>LT10: I can create new functions given transformations.</p>	<p>CSA: B1-B5 Chapter 3 Test</p>	
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October

Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ:</p>	<p>C. Trigonometric Functions</p>	<p>LT1: I can convert between</p>		

<ul style="list-style-type: none"> • How do trigonometric functions relate to the unit circle? • What do the graphs of the trigonometric functions look like and how are they related? • What are the characteristics of trigonometric functions? <p>C. Trigonometric Functions</p> <p>C1. Magnitudes of Rotations and Measures of Arcs</p> <p>C2. Sines, Cosines and Tangents</p> <p>C3. Basic Trigonometric Identities</p> <p>C4. Exact Values of Sines, Cosines and Tangents</p> <p>C5. Sine and Cosine Functions</p> <p>C6. The Tangent Function and Periodicity</p> <p>C7. Scale-Change Images of Trigonometric Functions</p>	<p>C1. Convert between degrees, radians and revolutions.</p> <p>C2. Use definitions of sine, cosine and tangent and find values of sine, cosine and tangent.</p> <p>C3. Apply theorems about sine, cosine and tangent and utilize/understand the unit circle.</p> <p>C4. Apply knowledge of special right triangles to find exact values of sine, cosine and tangent in a unit circle.</p> <p>C5. Draw and interpret graphs of the parent sine and cosine functions in degrees or radians.</p> <p>C6. Apply the definition of the tangent function and draw/interpret graphs of tangent in radians or degrees.</p> <p>C7. Identify amplitude, period and frequency of trig functions. Write and solve trigonometric equations and graph/describe transformation images of trigonometric functions.</p>	<p>degrees, radians and revolutions.</p> <p>LT2: I can use definitions of sine, cosine and tangent.</p> <p>LT3: I can find values of sine, cosine and tangent.</p> <p>LT4: I can apply theorems about sine, cosine and tangent.</p> <p>LT5: I can utilize and understand the unit circle.</p> <p>LT6: I can apply knowledge of special right triangles to find exact values of sine, cosine and tangent in a unit circle.</p> <p>LT7: I can draw and interpret graphs of the parent sine and cosine functions in degrees and radians.</p> <p>LT8: I can apply the definition of the tangent function.</p> <p>LT9: I can draw and interpret graphs of tangent in radians or degrees.</p> <p>LT10: I can identify amplitude, period and frequency of trigonometric functions.</p> <p>LT11: I can write and solve trigonometric equations.</p> <p>LT12: I can graph and describe</p>	<p>CFA: C1 - C4 Quiz 4.1-4.5</p> <p>CSA: C1-C7 Test Chapter 4</p>	
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		transformation images of trigonometric functions.		
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November

Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ:</p> <ul style="list-style-type: none"> • How can we use trigonometry to find side lengths and angles of right triangles? • How can we find side lengths and angles of any triangle? • How is a trigonometric equation modeled and how can we solve it? <p>D. Trigonometry</p> <p>D1. Trigonometric Ratios in Right Triangles</p> <p>D2. The Inverse Sine, Cosine and Tangent Functions</p> <p>D3. The Law of Cosines and Law of Sines</p> <p>D4. The Law of Sines - Ambiguous Case</p> <p>D5. General Solutions to Trigonometric Equations</p> <p>D6. The Secant, Cosecant and</p>	<p>D. Trigonometry</p> <p>D1. Find sine, cosine and tangents of angles. Use trigonometry to find lengths of right triangles.</p> <p>D2. Evaluate inverse trigonometric functions. Write and solve equations for phenomena described by inverse trigonometric functions.</p> <p>D3. Use Law of Cosines and Law of Sines to find lengths and angles in triangles and real world problems.</p> <p>D4. Determine the number of solutions and solve triangles given the SSA case of a triangle.</p> <p>D5. Write and solve trigonometric equations given real world phenomena described by trigonometric functions.</p>	<p>LT1: I can find sine, cosine and tangents of angles.</p> <p>LT2: I can use trigonometry to find lengths of right triangles.</p> <p>LT3: I can evaluate inverse trigonometric functions.</p> <p>LT4: I can write and solve equations for phenomena described by inverse trigonometric functions.</p> <p>LT5: I can use Law of Cosines and Law of Sines to find lengths and angles in triangles and real world problems.</p> <p>LT6: I can determine the number of solutions and solve triangles given the SSA case of a triangle.</p> <p>LT7: I can write and solve trigonometric equations given real world phenomena described by trigonometric functions.</p>	<p>CFA: D1-D4 Quiz 5.1-5.6</p> <p>CSA: D1-D5 Chapter 5 Test</p>	

<p>Cotangent Functions</p> <p>UEQ:</p> <ul style="list-style-type: none"> • What are characteristics of polynomials and how do we use them in daily life? • How can we divide and factor polynomials to solve real life problems? • How do polynomials relate to graphs and what can we figure out from a graph of a polynomial? <p>E. Polynomial Functions</p> <p>E1. Characteristics of Polynomial Functions</p> <p>E2. Division and the Remainder Theorem</p> <p>E3. The Factor Theorem</p> <p>E4. Complex Numbers</p>	<p>E. Polynomial Functions</p> <p>E1. Calculate zeros and relative extrema of polynomial functions. Construct and interpret polynomials that model real situations by applying vocabulary of polynomials.</p> <p>E2. Use synthetic division to divide polynomials and find the quotient and remainder.</p> <p>E3. Factor polynomials and solve polynomial equations using the Factor Theorem and relate properties of polynomial functions and their graphs.</p> <p>E4. Perform operations with complex numbers.</p> <p>E5. Apply the Fundamental Theorem of Algebra to equations and graphs in order to find zeros of a function.</p>	<p>LT1: I can calculate zeros and relative extrema of polynomial functions.</p> <p>LT2: I can construct and interpret polynomials that model real situations.</p> <p>LT3: I can apply vocabulary of polynomials.</p> <p>LT4: I can use synthetic division to divide polynomials and find the quotient and remainder.</p> <p>LT5: I can factor polynomials and solve polynomial equations using the Factor Theorem.</p> <p>LT6: I can use the Factor Theorem to write a polynomial equation given a graph.</p> <p>LT7: I can relate properties of polynomial functions and their graphs.</p> <p>LT8: I can perform operations with complex numbers.</p> <p>LT9: I can apply the Fundamental Theorem of Algebra to equations</p>	<p>CSA: E1-E5 Chapter 7 Test</p>	
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E5. The Fundamental Theorem of Algebra		and graphs in order to find zeros of a function.		
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<p>UEQ:</p> <ul style="list-style-type: none"> • How can we model data? • How can we decipher what model is best to describe a set of data? • How do translations and scale changes affect data and their corresponding statistics? <p>F. Functions & Models, Graphs & Data</p> <p>F1. Linear Models</p> <p>F2. Linear Regression and Correlation</p> <p>F3. Choosing a Model</p> <p>F4. Translations of Data</p> <p>F5. Scale Changes of Data</p>	<p>F. Functions & Models, Graphs & Data</p> <p>F1. Compute residuals from observed and predicted values. Find and interpret linear models.</p> <p>F2. Use scatter plots and residual plots to draw conclusions about models for data.</p> <p>F3. Evaluate which type of model is more appropriate for data.</p> <p>F4. Use translations to describe and analyze data and statistics.</p> <p>F5. Use scale changes to describe and analyze data and statistics.</p>	<p>LT1: I can compute residuals from observed and predicted values.</p> <p>LT2: I can find and interpret linear models.</p> <p>LT3: I can use scatter plots and residual plots to draw conclusions about models for data.</p> <p>LT4: I can evaluate which type of model is more appropriate for data.</p> <p>LT5: I can use translations to describe and analyze data and statistics.</p> <p>LT6: I can use scale changes to describe and analyze data and statistics.</p>	<p>CSA: F1-F5 Chapter 2 & 3 Test</p> <p>CSA: A-F Part 1 Final</p>	
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December

Content	Skills	Learning Targets	Assessment	Resources & Technology
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<p>UEQ:</p> <ul style="list-style-type: none"> • How do we calculate statistics and use them to interpret data? • How are statistical measures related and how can we best describe data? • How can we describe data using measures of spread and center? • How can we compare and contrast sets of data using statistical analysis? <p>G. Exploring Data</p> <p>G1. Variables, Tables and Graphs</p> <p>G2. Centers of Data and Weighted Averages</p> <p>G3. Creating and Using Histograms</p> <p>G4. Box Plots</p> <p>G5. Cumulative Distributions</p> <p>G6. Measures of Spread: Variance and Standard Deviation</p> <p>G7. Comparing Numerical Distributions</p>	<p>G. Exploring Data</p> <p>G1. Know and use statistical vocabulary to interpret data presented in a table.</p> <p>G2. Calculate measures of center, weighted averages and weighted frequencies. Determine the best descriptive measure for a set of data.</p> <p>G3. Read, create and interpret histograms and population pyramids from a set of data.</p> <p>G4. Calculate measures of center and spread to draw conclusions about data. Read, create and interpret box plots from data.</p> <p>G5. Calculate and draw line graphs of cumulative frequencies and cumulative relative frequencies from tables of frequencies.</p> <p>G6. Calculate measures of center and spread for data sets. Describe how these measures are related and use statistics to draw conclusions about data.</p> <p>G7. Use statistics to compare and contrast two data sets in the context of an applied situation.</p> <p>G8. Use statistics to compare and</p>	<p>LT1: I can know and use statistical vocabulary to interpret data presented in a table.</p> <p>LT2: I can calculate measures of center, weighted averages and weighted frequencies.</p> <p>LT3: I can determine the best descriptive measure for a set of data.</p> <p>LT4: I can read, create and interpret histograms and population pyramids from a set of data.</p> <p>LT5: I can calculate measures of center and spread to draw conclusions about data.</p> <p>LT6: I can read, create and interpret box plots from data.</p> <p>LT7: I can calculate and draw line graphs of cumulative frequencies and cumulative relative frequencies from tables of frequencies.</p> <p>LT8: I can calculate measures of center and spread for data sets.</p> <p>LT9: I can describe how statistical measures are related and use them to draw conclusions about data.</p> <p>LT10: I can use statistics to</p>	<p>CFA: G1-G4 Quiz 1.1-1.4</p> <p>CFA: G1-G4 Car Data Project</p> <p>CSA: G1-G8 Chapter 1 Test</p>	
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<p>G8. Using Statistics to Solve a Mystery</p>	<p>contrast two data sets in the context of the Federalist Papers.</p>	<p>compare and contrast two data sets in the context of an applied situation.</p> <p>LT11: I can use statistics to compare and contrast two data sets in the context of the Federalist Papers.</p>		
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January 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ:</p> <ul style="list-style-type: none"> • How do we compute probabilities in real life contexts? • How are probabilities, frequencies, relative frequencies and percentages related? • How can we simulate experiments and determine whether observations are statistically significant? <p>H. Counting, Probability and Inference</p> <p>H1. Introduction to Probability</p> <p>H2. Principles of Probability</p> <p>H3. Counting with Replacement</p> <p>H4. Counting without Replacement</p>	<p>H. Counting, Probability and Inference</p> <p>H1. Compute probabilities of events in various contexts and list sample spaces and events for experiments.</p> <p>H2. Compute probabilities of mutually exclusive events, unions and complements.</p> <p>H3. Find number of strings with replacement and determine whether events are independent or dependent. Calculate probabilities in real situations and the number of ways of arranging objects.</p> <p>H4. Find the number of ways of arranging objects without replacement. Evaluate expressions using factorials and calculate</p>	<p>LT1: I can compute probabilities of events in various contexts.</p> <p>LT2: I can list sample spaces and events for experiments.</p> <p>LT3: I can compute probabilities of mutually exclusive events, unions and complements.</p> <p>LT4: I can find the number of strings with replacement.</p> <p>LT5: I can determine whether events are independent or dependent.</p> <p>LT6: I can calculate probabilities in real situations and the number of ways of arranging objects.</p>	<p>CFA: H1-H4 Quiz 6.1-6.4</p> <p>CSA: H1-H9 Chapter 6 Test</p>	

<p>H5. Contingency Tables</p> <p>H6. Conditional Probability</p> <p>H7. Designing Simulations</p> <p>H8. Two Laws of Probability</p> <p>H9. The Chi-Square Test</p>	<p>probabilities in real life situations.</p> <p>H5. Use a contingency table to compute percentages involving qualitative variables. Represent information about relative frequencies or frequencies in a contingency table.</p> <p>H6. Calculate conditional probabilities in real contexts.</p> <p>H7. Design and conduct simulations with or without technology.</p> <p>H8. Compute expected counts of events in various contexts. Understand and interpret the Law of Large Numbers and the Law of Averages.</p> <p>H9. Use the Chi-Square statistic to determine whether or not an event is likely.</p>	<p>LT7: I can find the number of ways of arranging objects without replacement.</p> <p>LT8: I can evaluate expressions using factorials.</p> <p>LT9: I can calculate probabilities in real life situations.</p> <p>LT10: I can use a contingency table to compute percentages involving qualitative variables.</p> <p>LT11: I can represent information about relative frequencies or frequencies in a contingency table.</p> <p>LT12: I can calculate conditional probabilities in real contexts.</p> <p>LT13: I can design and conduct simulations with or without technology.</p> <p>LT14: I can compute expected counts of events in various contexts.</p> <p>LT15: I can understand and interpret the Law of Large Numbers and the Law of Averages.</p> <p>LT16: I can use the Chi-Square statistic to determine whether or not an event is likely.</p>		
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February

Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ:</p> <ul style="list-style-type: none"> • How are binomials and Pascal's Triangle related? • What are binomial distributions and where are they found in real contexts? • How can we describe binomial distributions with statistics? <p>I. Binomial Distributions</p> <p>11. Combinations</p> <p>12. Pascal's Triangle</p> <p>13. The Binomial Theorem</p> <p>14. Probability Distributions</p> <p>15. Binomial Probabilities</p> <p>16. Binomial Probability Distributions</p> <p>17. Mean and Standard Deviation of a Binomial Random Variable</p>	<p>I. Binomial Distributions</p> <p>I1. Use combinations to compute the number of ways of selecting objects. Compute probabilities involving combinations in non-binomial problems.</p> <p>I2. Apply properties involving combinatorics to Pascal's Triangle. Understand and use patterns in Pascal's Triangle.</p> <p>I3. Expand binomials using the Binomial Theorem and represent combinations and binomial coefficients by Pascal's Triangle.</p> <p>I4. Interpret and create probability distribution tables and graphs. Compute the mean and standard deviation of a random variable.</p> <p>I5. Calculate probabilities in situations involving binomial experiments.</p> <p>I6. Identify and apply characteristics of binomial probability distributions. Graph and interpret binomial probability distributions.</p> <p>I7. Calculate mean and standard</p>	<p>LT1: I can use combinations to compute the number of ways of selecting objects.</p> <p>LT2: I can compute probabilities involving combinations in non-binomial problems.</p> <p>LT3: I can apply properties involving combinatorics to Pascal's Triangle.</p> <p>LT4: I can understand and use patterns in Pascal's Triangle.</p> <p>LT5: I can expand binomials using the Binomial Theorem.</p> <p>LT6: I can represent combinations and binomial coefficients by Pascal's Triangle.</p> <p>LT7: I can interpret and create probability distribution tables and graphs.</p> <p>LT8: I can compute the mean and standard deviation of a random variable.</p> <p>LT9: I can calculate probabilities in situations involving binomial</p>	<p>CFA: I1-I3 Quiz 10.1-10.5</p> <p>CSA: I3-I7 Chapter 10 Test</p>	

	deviation of a binomial random variable.	experiments. LT10: I can identify and apply characteristics of binomial probability distributions. LT11: I can graph and interpret binomial probability distributions. LT12: I can calculate mean and standard deviation of a binomial random variable.		
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March

Content	Skills	Learning Targets	Assessment	Resources & Technology
<p>UEQ:</p> <ul style="list-style-type: none"> • What are normal distributions and how do they apply to the real world? • How can we test hypotheses using normally distributed data? • How can we estimate averages given a sample of data? <p>J. Normal Distributions</p> <p>J1. Normal Curves</p> <p>J2. Finding Probabilities Using the Standard Normal Curve</p> <p>J3. Other Normal Distributions</p>	<p>J. Normal Distributions</p> <p>J1. Use properties of normal distributions and interpret graphs of normal distributions.</p> <p>J2. Find probabilities of standard normal distributions.</p> <p>J3. Solve probability problems using normal distributions.</p> <p>J4. Apply the Central Limit Theorem to simple random samples.</p> <p>J5. Use normal distributions to test hypotheses.</p> <p>J6. Identify relationships between</p>	<p>LT1: I can use properties of normal distributions.</p> <p>LT2: I can interpret graphs of normal distributions.</p> <p>LT3: I can find probabilities of standard normal distributions.</p> <p>LT4: I can solve probability problems using normal distributions.</p> <p>LT5: I can apply the Central Limit Theorem to simple random samples.</p> <p>LT6: I can use normal distributions</p>	<p>CFA: J1-J4 Quiz 11.1-11.5</p> <p>CSA: J1-J7 Chapter 11 Test</p> <p>CSA: J1-J7 Chapter 11 Project</p> <p>CSA: G-J: Part 2 Final</p>	

<p>J4. The Central Limit Theorem</p> <p>J5. Making Inferences about Means</p> <p>J6. Confidence Intervals</p> <p>J7. Confidence Intervals in Binomial Experiments</p>	<p>sample size, margin of error and confidence level. Apply and compute confidence intervals in real world problems.</p> <p>J7. Apply confidence intervals to binomial experiments.</p>	<p>to test hypotheses.</p> <p>LT7: I can identify relationships between sample size, margin of error and confidence level.</p> <p>LT8: I can apply and compute confidence intervals in real world problems.</p> <p>LT9: I can apply confidence intervals to binomial experiments.</p>		
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