Trigonometry

9.1/9.2 Explore angle measures and the unit circle

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Understand radians (F.TF.1)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	**Explain** and use the relationship between radian measures and degrees/arc lengths to solve problems	**Use the relationship** between radian measures and degrees/arc lengths to solve problems	**Convert** between radians and degrees	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Create the unit circle (F.TF.2, F.TF.3)		Use special triangles to determine **and explain** the values of sine, cosine, tangent for **anything between 0 and 2π** on the unit circle	Use special right triangles to determine the values of sine, cosine, tangent for **0**, π/6, π/4, π/3 and **π/2** on the unit circle	Use special right triangles to determine the values of sine, cosine and tangent **for π/6, π/4 and π/3** on the unit circle	
Pythagorean identity of sine and cosine (F.TF.8)		**Prove** the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ and use it to find $sin(\theta)$, $cos(\theta)$, and $tan(\theta)$	Use the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ to find $sin(\theta)$, $cos(\theta)$, **and** $tan(\theta)$	**Use** the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ to find $sin(\theta)$, $cos(\theta)$, **or** $tan(\theta)$	

F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

F.TF.3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, ~~and use the unit circle to express the values of sine, cosine, and tangent for π−x, π+x, and 2π−x in terms of their values for x, where x is any real number.~~

F.TF.8 Prove the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ and use it to find $sin(\theta)$, $cos(\theta)$,or $tan(\theta)$ given $sin(\theta)$, $cos(\theta)$, or $tan(\theta)$ and the quadrant of the angle.

Summatively assess after completing Explore and Investigation 1 in Concept 9.2

The remaining portion of Concept 9.2 is within Represent and Apply Trigonometric Functions

Trigonometry

9.2/9.3 Represent and apply trigonometric functions

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Create trigonometric functions (F.TF.5)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Given a specified amplitude, frequency, and midline for a real world situation, **create a sine, cosine and/or tangent function**	Given the sine, cosine or tangent function for a real world situation, identify the amplitude, frequency **and** midline	Given the sine, cosine or tangent function for a real world situation, identify the amplitude, frequency **or** midline	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Graph and identify key features of trig functions (F.IF.7e)		Graph a sine, cosine, **and tangent** function, with an amplitude change, period change, and midline change.	Graph a sine and cosine function with an amplitude change, period change, **and** midline change.	Graph a sine and cosine function with an amplitude change, period change, **or** midline change.	
Compare key features (F.IF.9)		Compare key features of two functions represented ● algebraically ● graphically ● numerically in tables ● verbal descriptions **in context of a situation** Key features include: ● midline ● amplitude ● minimums and maximums	Compare key features of two functions represented ● algebraically ● graphically ● numerically in tables ● verbal descriptions Key features include: ● midline ● amplitude ● **minimum and maximums** ● **increasing or decreasing**	Compare key features of two functions represented ● algebraically ● graphically ● numerically in tables ● verbal descriptions Key features include: ● midline ● amplitude	

F.TF.5★ Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

F.IF.7e Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases
e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.