Trigonometry

Instructional Focus: Use unit circles and inverse trigonometric functions

	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Use special triangles (F.TF.3)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Use special triangles to determine the values of sine, cosine, tangent, secant, cosecant, and cotangent for 0, π/6, π/4 and π/3, π/2 and **use the unit circle to express the values of sine, cosine, tangent, secant, cosecant, and cotangent for π–*x*, π+*x*, and 2π–*x* in terms of their values for *x*, where *x* is any real number**	Use special triangles to determine the values of sine, cosine, tangent, **secant, cosecant, and cotangent** for **0**, π/6, π/4, π/3 and **π/2**	Use special triangles to determine the values of **sine, cosine and tangent** for π/6, π/4 and π/3	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Use unit circles to find values (F.TF.4)		Use the unit circle to express any angle, including negative angles and angles involving more than 1 rotation, in terms of its standard position to find **all six** trigonometric functions.	Use the unit circle to express any angle, between 0 and 2π, in terms of its standard position to find ALL 6 trig functions.	Use the unit circle to express any angle, between 0 and 2π, in terms of its standard position to find the **sine, cosine, and tangent functions**.	
Construct Inverse trigono-metric functions (F.TF.6)		**Construct an invertible trigonometric function by restricting the domain so that the function is always increasing or decreasing**	**Identify a domain that will allow construction of the inverse of a trigonometric function, because the function would be always increasing or decreasing**	Given a portion of a trigonometric graph, identify if that part of the graph is invertible	
Use inverse trigono-metric functions (F.TF.7)		Use inverse functions to solve trigonometric equations with restricted and unrestricted domains **and interpret the solutions in context of the situation**	Use inverse functions to solve trigonometric equations with restricted **and unrestricted** domains	Use inverse functions to solve trigonometric equations with **restricted domains**	
Pythagor-ean identity (F.TF.8) Given $\cos\theta =$		**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.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.
Functions F.TF.4 (+) Use the unit circle to ~~explain symmetry (odd and even)~~ and periodicity of trigonometric functions.

F.TF.6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.

F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.★

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.