

Unit 6 - Trigonometry: Triangles & Functions: BIG PICTURE:

(1) Once a foundational concept is understood, we can develop new knowledge and new ideas as we extend the foundational concept by simply asking "what if ..." or "what about" or "how would things change if" Any topic in math can be EXTENDED as new ideas/skills/process get introduced or get applied. We will demonstrate this EXTENSION in our study of Sinusoidal Functions.

(i.e.) What happens when we put a right triangle (simple idea behind RTT) into a circle and into a Cartesian grid and start rotating the hypotenuse of the triangle around the circumference of the circle?)

(i.e.) How can we relate "angles in standard position" to a simple idea like trig ratios in right triangles

(i.e.) why do we change the unit of measure of angles (degrees) to a new unit (radians) and what is the effectiveness of using radians as compared to using degrees?

(2) Any topic in math can be CONNECTED to previously taught ideas/skills/processes. We will demonstrate this CONNECTION in our study of Sinusoidal Functions.

(i.e. how does our mastery of skills associated with functions help us to algebraically analyze/work with sinusoidal fcns ==> revisiting ideas like transformations, inverses, symmetries)

(3) Key features of a function (like sinusoidal functions in this unit) can be easily identified by a knowledge of the form of the equation.

(4) In what contexts can a sinusoidal function be used to model real world scenarios?

Trigonometry & Triangles:

1. Be able to work with trig ratios in the context of triangles, equations, graphs
2. be able to solve single right triangles using SOHCAHTOA
3. be able to solve for unknowns in right triangles in diagrams wherein multiple right triangles are presented
4. be able to apply right triangle models to work out solutions to problems based upon real world models
5. be able to determine the height and areas of non-right triangles
6. be able to state the special trig ratios of angles of 30° , 60° and 45° and then be able to solve simple trig equations and inverse trig equations involving these special ratios and angles
7. be able to EXPLAIN how we can use right triangles to develop solution strategies to triangles that do not have right angles (both acute & obtuse triangles)
8. be able to apply the Law of Sines to solutions of triangles, in both simple geometric contexts as well as to application/modeling problems
9. be able to apply the Law of Cosines to solutions of triangles, in both simple geometric contexts as well as to application/modeling problems
10. be able to determine WHEN to use the Law of Sines and the Law of Cosines

Trigonometry & Coordinate Geometry:

11. be able to work with angles in standard position and identify principle angles, related acute angles (reference angles), & coterminal angles
12. be able to work out the trig ratios of an angle in standard position if the terminal arm passes through a known co-ordinate (i.e given a point like (3,-4), be able to work out the sine or tangent ratios)
13. be able to understand the basic idea of the unit circle from an understanding of angles in standard position

Trigonometry and Sinusoidal Functions:

14. be able to understand how rotating a terminal arm through the four quadrants of a Cartesian plane will generate a sinusoidal relationship/pattern
15. be able to work with any phenomenon that is periodic in nature, from the non-formulaic perspective of "periodicity", "amplitude", "equilibrium/middle"
16. be able to work with the parent functions of $f(x) = \sin(x)$ and $f(x) = \cos(x)$ from a key features perspective (amplitude, period, equilibrium)
17. be able to transform the parent functions of $f(x) = \sin(x)$ and $f(x) = \cos(x)$ and thus apply with the new function of $f(x) = A \sin/\cos k(x - C) + D$
18. be able to write an equation of a transformed sinusoidal function from its graph & vice versa (graphing/sketching from an equation)
19. be able to write equations & make sketches of sinusoidal functions from a data set & from a contextual description
20. be able to apply function concepts like inverses, transformations and composition to sinusoidal functions
21. be able to evaluate and solve trigonometric equations