

Math THREE - MVP Lessons with Identified OAS Standards

*This document is for the *lesson* only. ReadySetGo may cover other standards.

Module 1: Functions & Their Inverses				
MVP Lesson		MVP Type of Understanding	Description	OAS-M
1.1	Brutus Bites Back	Develop	Develops the concept of inverse functions in a linear modeling context using tables, graphs, and equations.	A2.F.2.3
1.2	Flipping Ferraris	Solidify	Extends the concepts of inverse functions in a quadratic modeling context with a focus on domain and range and whether a function is invertible in a given domain.	A2.F.2.3
1.3	Tracking the Tortoise	Solidify	Solidifies the concepts of inverse function in an exponential modeling context and surfaces ideas about logarithms.	A2.F.2.3, A2.F.2.4
1.4	Pulling a Rabbit Out of a Hat	Solidify	Uses function machines to model functions and their inverses. Focus on finding inverse functions and verifying that two functions are inverses.	A2.F.2.3, A2.F.2.2
1.5	Inverse Universe	Practice	Uses tables, graphs, equations, and written descriptions of functions to match functions and their inverses together and to verify the inverse relationship between two functions.	A2.F.2.3, A2.F.2.2,
Module 2: Logarithmic Functions				
MVP Lesson		MVP Type of Understanding	Description	OAS-M
2.1	Log Logic	Develop	Evaluate and compare logarithmic expressions.	A2.F.2.4
2.2	Falling Off a Log	Solidify	Graph logarithmic functions with transformations	A2.F.1.2
2.3	Chopping Logs	Solidify	Explore properties of logarithms.	No OAS, setting stage for A2.A.1.6
2.4	Log-Arithm-etic	Practice	Use log properties to evaluate expressions	A2.A.1.6
2.5	Powerful Tens	Practice	Solve exponential and logarithmic functions in base 10 using technology	A2.A.1.2, A2.A.1.6

2.6H	Compounding the Problem	Develop	Develop the number e	No OAS
2.7H	Logs Go Viral	Solidify	Use base e exponential functions and natural logarithms to model continuous growth and decay	A2.F.1.4
2.8H	Chose This, Not That	Solidify	Solve exponential and logarithmic equations	A2.F.2.1
2.9H	Don't Forget Your Login	Practice	Solve and categorize exponential and logarithmic equations	A2.F.2.1

Module 3: Polynomial Functions

MVP Lesson		MVP Type of Understanding	Description	OAS-M
3.1	Scott's March Madness	Develop	Introduce polynomial functions and their rates of change	A2.A.1.1, A2.A.1.2, A2.A.1.7
3.2	You-mix Cubes	Solidify	Graph $y = x^3$ with transformations and compare to $y = x^2$	A2.F.1.2, A2.F.1.5, A2.A.1.1
3.3	It All Adds Up	Develop	Add and subtract polynomials	A2.F.2.1
3.4	Pascal's Pride	Solidify	Multiply polynomials and use Pascal's to expand binomials	No OAS
3.5	Divide and Conquer	Solidify	Divide polynomials and write equivalent expressions using the Polynomial Remainder Theorem.	No OAS
3.6	Sorry, We're Closed	Practice	Compare polynomials and integers and determine closure under given operations	A2.N.1.2, A2.F.1.5
3.7	Building Strong Roots	Solidify	Understand the Fundamental Theorem of Algebra and apply it to cubic functions to find roots.	A2.A.1.1, A2.A.1.4, A2.F.1.5
3.8	Getting to the Root of the Problem	Solidify	Find the roots of polynomials and write polynomial equations in factored form.	A2.A.1.4
3.9	Is This the End	Solidify	Examine the end behavior of polynomials and determine whether they are even or odd	PC.F.1.4
3.1	Puzzling Over Polynomials	Practice	Analyze polynomials, determine roots, end behavior, and write equations	A2.A.1.5, A2.A.2.3

Module 4: Rational Expressions and Functions				
MVP Lesson		MVP Type of Understanding	Description	OAS-M
4.1	Winner, Winner	Develop	Introducing rational functions and asymptotic behavior	A2.F.1.6, A2.F.1.1
4.2	Shift and Stretch	Solidify	Applying transformations to the graph of $f(x) = 1/x$	A2.F.1.2, A2.F.1.6
4.3	Rational Thinking	Solidify	Discovering the relationship between the degree of the numerator and denominator and the horizontal asymptotes	A2.F.1.6, A2.F.1.1
4.4	Are You Rational?	Solidify	Reducing rational functions and identifying improper rational functions and writing them in an equivalent form.	A2.A.2.2, A2.A.1.3
4.5	Just Act Rational	Solidify	Adding, subtracting, multiplying, and dividing rational expressions.	A2.A.2.2
4.6	Sign on the Dotted Line	Practice	Developing a strategy for determining the behavior near the asymptotes and graphing rational functions.	A2.F.1.6, A2.F.1.1
4.7	We All Scream	Practice	Modeling with rational functions, and solving equations that contain rational expressions.	A2.A.1.3, A2.A.2.3, A2.A.1.4
Module 5: Modeling with Geometry				
MVP Lesson		MVP Type of Understanding	Description	OAS-M
7.1	Any Way You Slice It	Develop	Visualizing two-dimensional cross sections of three dimensional objects	No OAS
7.2	Any Way You Spin It	Develop	Visualizing solids of revolution	No OAS
7.3	Take Another Spin	Solidify	Approximating volumes of solids of revolution with cylinders and frustums	No OAS
7.4	You Nailed It!	Practice	Solving problems using geometric modeling	G.3D.1.1
7.5	Special Rights	Solidify	Examining the relationship of sides in special right triangles	G.RT.1.2
7.6	More Than Right	Develop	Examining the relationship of sides in special right triangles	PC.T.2.2
7.7	Justifying the Laws	Solidify	Examining the Law of Cosines and the Law of Sines	PC.T.2.1, PC.T.2.2

7.8	Triangle Areas by Trig	Practice	Finding the missing sides, angles and areas of general triangles	PC.T.1.1, PC.T.2.2, PC.T.2.3
Module 6: Modeling Periodic Behavior				
MVP Lesson		MVP Type of Understanding	Description	OAS-M
6.1	George W. Ferris' Day Off	Develop	Using reference triangles, right triangle trigonometry and the symmetry of a circle to find the y-coordinates of points on a circular path	PC.T.1.4, PC.T.1.5
6.2	"Sine" Language	Solidify	Using reference triangles, right triangle trigonometry, angular speed and the symmetry of a circle to find the y-coordinates of points on a circular path at given instances in time—an introduction to the circular trigonometric functions	PC.T.1
6.3	More "Sine" Language	Solidify	Extending the definition of sine from a right triangle trigonometric ratio to a function of an angle of rotation	PC.T.1
6.4	More Ferris Wheels	Solidify	Graphing a sine function to model circular motion and relating features of the graph to the parameters of the function	PC.T.1
6.5	Moving Shadows	Practice	Extending the definition of the cosine from a right triangle trigonometric ratio to a function of an angle of rotation	PC.T.1
6.6	Diggin' It	Develop	Introducing radians as a unit for measuring angles on concentric circles	PC.T.1.1, PC.T.1.2
6.7	Staking It	Solidify	Using the proportionality relationship of radian measure to locate points on concentric circles	No OAS
6.8	"Sine"ing and "Cosine"ing It	Solidify	Redefining radian measure of an angle as the length of the intercepted arc on a unit circle	No OAS
6.9	Water Wheels and the Unit Circle	Practice	Defining sine and cosine on the unit circle in terms of angles of rotation measured in radians	No OAS

Module 7: Trigonometric Functions, Equations, & Identities

MVP Lesson		MVP Type of Understanding	Description	OAS-M
7.1	High Noon and Sunset Shadows	Develop	Introducing the horizontal shift of a trigonometric function in a modeling context	PC.T.1
7.2	High Tide	Solidify	Using trigonometric graphs and inverse trigonometric functions to model periodic behavior	PC.T.1
7.3	Getting on the Right Wavelength	Practice	Practice using trigonometric graphs and inverse trigonometric functions to model periodic behavior	PC.T.1
7.4	Off on a Tangent	Develop	Extending the definition of tangent from a right triangle trigonometric ratio to a function of an angle of rotation measured in degrees or radians	PC.T.1
7.5	Maintaining Your Identity	Develop	Using diagrams to introduce fundamental trig identities, including identities related to odd and even functions	PC.T.3
7.6	Hidden Identities	Practice	Using fundamental trig identities to change the form of trig expressions, and as an aid to solving trig equations	PC.T.3.3
7.7H	Double Identity	Solidify	Extending trig identities to include the addition, subtraction and double identities for sine, cosine, and tangent	PC.T.3
7.8H	The Amazing Inverse Trig Function Race	Solidify	Extending students' thinking about inverse trig functions and examining the graph of the inverse sine, cosine and tangent functions	PC.T.2.4
7.9H	More Hidden Identities	Practice	Using trig identities to change the form of trig expressions, and as an aid to solving trig equations	PC.7.3.3
7.10H	Polar Planes	Develop	Introducing polar coordinates and polar grids	PC.T.4.5
7.11H	Complex Polar Forms	Solidify	Introducing and using the polar form of complex numbers to multiply, divide and find roots of complex numbers	PC.T.4.4, PC.T.4.7

Module 8: Modeling with Functions

MVP Lesson		MVP Type of Understanding	Description	OAS-M
8.1	Function Family Reunion	Solidify	Examining transformations of a variety of familiar functions using tables	A1.F.2.2, A2.F.1.2
8.2	Imagineering	Develop	Predicting the shape of a graph that is the sum or product of familiar functions	No OAS
8.3	The Bungee Jump Simulator	Solidify	Combining a variety of functions using arithmetic operations to model complex behavior	A2.F.1.4
8.4	Composing and Decomposing	Develop	Combining a variety of functions using function composition to model complex behavior	No OAS
8.5	Translating My Composition	Solidify	Extending function transformations by composing and decomposing functions	A2.F.2.2, A2.F.1.2
8.6	Different Combinations	Practice	Combining functions defined by tables, graphs or equations using function composition and/or arithmetic operations	A2.F.2.2, A2.F.2.3
8.7H	High Noon and Sunset Shadows Combined	Develop	Sketching curves that have been defined parametrically	PC.V.1
8.8H	Parametrically-Defined Curves	Solidify	Formally defining parametric curves and illustrating how such curves can be thought of as relationships between an input parameter t and an output that consists of an ordered-pair (x, y)	PC.V.1

Module 9: Statistics

MVP Lesson		MVP Type of Understanding	Description	OAS-M
9.1	What is Normal?	Develop	Understanding normal distributions and identify their features	A2.D.1.1
9.2	Just ACT Normal	Solidify	Using the features of a normal distribution to make decisions	A2.D.1.1
9.3	Y B Normal?	Solidify	Introducing z-scores to compare normal distributions	A2.D.1.1 (Based on z-scores; No OAS)
9.4	Wow, That's Weird!	Practice	Comparing normal distributions using z scores and understanding of mean and standard deviation	A2.D.1.1 (Based on z-scores; No OAS)

9.5	Would You Like to Try a Sample	Develop	Understanding and identifying different methods of sampling	A2.D.2
9.6	Let's Investigate	Solidify	Identifying the difference between survey, observational studies, and experiments	No OAS
9.7	Slacker's Simulation	Solidify	Using simulation to estimate the likelihood of an event	A1.D.2.3