

Calculus

| State Standard Number | State Standard Area/Description | Unit Name | Course Topic Description |
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| 111.35.P.1 | The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. | | |
| 111.35.P.1.A | describe parent functions symbolically and graphically, including $f(x) = x$ to the n power, $f(x) = 1/n x$, $f(x) = \log_a x$, $f(x) = 1/x$, $f(x) = e$ to the x power, $f(x) = x $, $f(x) = a$ to the x power, $f(x) = \sin x$, $f(x) = \arcsin x$, etc.; | | |
| 111.35.P.1.B | determine the domain and range of functions using graphs, tables, and symbols; | Graph Behavior | Graph Analysis |
| 111.35.P.1.C | describe symmetry of graphs of even and odd functions; | | |
| 111.35.P.1.D | recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function; and | Graph Behavior | Graph Analysis |
| 111.35.P.1.E | investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically. | Graph Behavior Limits and Continuity | Asymptotes and End Behavior Concept of a Limit, Algebraic Computation of a Limit |
| 111.35.P.2 | The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. | | |
| 111.35.P.2.A | apply basic transformations, including $a * f(x)$, $f(x) + d$, $f(x - c)$, $f(b * x)$, and compositions with absolute value | | |

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| | functions, including $ f(x) $, and $f(x)$, to the parent functions; | | |
| 111.35.P.2.B | perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically; and | | |
| 111.35.P.2.C | investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties. | | |
| 111.35.P.3 | The student uses functions and their properties, tools and technology, to model and solve meaningful problems. | | |
| 111.35.P.3.A | investigate properties of trigonometric and polynomial functions; | | |
| 111.35.P.3.B | use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data; | | |
| 111.35.P.3.C | use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient); | | |
| 111.35.P.3.D | use properties of functions to analyze and solve problems and make predictions; and | | |

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| 111.35.P.3.E | solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed. | Differentiation | Basic Computation Rules |
| 111.35.P.4 | The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. | Throughout Course | Throughout Course |
| 111.35.P.4.A | represent patterns using arithmetic and geometric sequences and series; | | |
| 111.35.P.4.B | use arithmetic, geometric, and other sequences and series to solve real-life problems; | | |
| 111.35.P.4.C | describe limits of sequences and apply their properties to investigate convergent and divergent series; and | Limits and Continuity | Concept of a Limit |
| 111.35.P.4.D | apply sequences and series to solve problems including sums and binomial expansion. | | |
| 111.35.P.5 | The student uses conic sections, their properties, and parametric representations, as well as tools and technology, to model physical situations. | Derivative Applications | Related Rates |

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| 111.35.P.5.A | use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets; | | |
| 111.35.P.5.B | use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound; | | |
| 111.35.P.5.C | convert between parametric and rectangular forms of functions and equations to graph them; and | | |
| 111.35.P.5.D | use parametric functions to simulate problems involving motion. | | |
| 111.35.P.6 | The student uses vectors to model physical situations. | | |
| 111.35.P.6.A | use the concept of vectors to model situations defined by magnitude and direction; and | | |
| 111.35.P.6.B | analyze and solve vector problems generated by real-life situations. | | |