

USD 312

Pre-calculus

Standard 1: Students will use number sense in a variety of situations.

Indicators of Performance:

Students will -

1. use the following properties:
 - associative prop of addition and multiplication
 - commutative property of addition and multiplication
 - identity property of addition and multiplication
 - distributive property
 - multiplicative property of zero
 - addition and multiplication properties of equality and inequality
 - addition and multiplication inverse properties
 - reflexive, symmetric and transitive properties of equality
 - zero product property
 - substitution prop of equality
2. estimate quantities using real numbers and/or algebraic expressions
3. adjust estimates based on additional information
4. determine whether a situation calls for an exact or approximate value
5. use estimation to check if an answer is reasonable
6. form and solve real-world problems, reason and communicate about mathematics using the previous indicators of performance for number sense in combination with indicators from other standards

Standard 2: Students will use computation in a variety of situations.

Indicators of Performance:

Students will -

1. add, subtract, multiply and divide complex numbers
2. add, subtract, multiply, divide and find the composition of functions
3. evaluate a function using synthetic substitution
4. use synthetic division to divide polynomials by linear binomials
5. convert between radian and degree measure
6. use calculators to evaluate the six trigonometric functions
7. find values of inverse trigonometric functions
8. write complex numbers in polar form
9. multiply complex numbers in polar form
10. change logarithms from one base to another
11. form and solve real-world problems, reason and communicate about mathematics using the previous indicators of performance for computation in combination with indicators from other standards

“S” preceding an indicator means it is in the pool of Kansas State Assessment Test items.

“SN” preceding an indicator means it is in the non-calculator pool of Kansas State Assessment Test items.

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Standard 3: Students will use algebraic concepts in a variety of situations.

Indicators of Performance:

Students will -

1. find an equation of a line given its geometric properties (ex. slope, perpendicular bisector, intercepts...)
2. define quadratic functions
3. solve quadratic equations by factoring, completing the square and quadratic formula
4. identify different types of polynomials (constants, linear, quadratics, cubics or quartics)
5. use the remainder and factor theorems to determine the value of a function at a specified point
6. use graphing calculators to approximate real roots of a polynomial equation
7. use properties of the roots to write polynomial equations
8. determine the domain, range and zeros of functions
9. determine the domain of functions after operations are performed
10. find the inverse of a one-to-one function
11. simplify expressions involving rational exponents
12. simplify expressions involving logarithms
13. use the unit circle to find values of sine and cosine of special angles (0, 30, 45, 60, 90 ...)
14. use reference angles to evaluate trigonometric functions
15. prove trigonometric identities and simplify trigonometric expressions
16. use formulas for $\sin(A \pm B)$, $\cos(A \pm B)$, double-angle, and half-angle identities
17. convert polar coordinates to rectangular coordinates; convert rectangular coordinates to polar coordinates
18. find recursive and explicit formulas for the n th term of an arithmetic or geometric sequence
19. find or estimate limits of infinite sequences
20. find the sum of an infinite geometric series
21. find the sum of the first n terms of an arithmetic or geometric series
22. represent a series using sigma notation
23. solve factorable polynomial equations
24. solve polynomial inequalities in one variable
25. solve simple trigonometric equations (ex. $\sin \theta = .7$)
26. solve systems of linear equations using matrices and graphing calculators
27. form and solve real-world problems, reason and communicate about mathematics using the previous indicators of performance for algebraic concepts in combination with indicators from other standards

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Standard 4: Students will use geometry in a variety of situations.

Indicators of Performance:

Students will -

1. find line of best fit (least squares regression line)
2. find functions of best fit including exponential functions
3. graph the following: quadratic functions, polynomial functions, polynomial inequalities in two variables, simple piecewise functions, greatest integer functions, exponential functions, logarithmic functions, conic sections, and trigonometric functions
4. graph polynomial functions with the use of technology
5. find the arc length and area of a sector
6. solve trigonometric equations using graphing calculators
7. use trigonometry to solve for missing parts of a right triangle
8. use the law of sines or law of cosines to solve for missing parts of a triangle
9. find the area of a triangle using the formula $A = \frac{1}{2} ab \sin C$
10. graph polar equations on graphing calculators
11. graph rational functions using limits
12. form and solve real-world problems, reason and communicate about mathematics using the previous indicators of performance for geometry in combination with indicators from other standards

Standard 5: Students will use statistics in a variety of situations.

Indicators of Performance:

Students will -

1. draw and interpret box-and-whiskers plots and stem-and-leaf plots
2. make predictions from a linear model
3. find and interpret the mean, median and mode
4. find variance and standard deviation from a data set with five or less data points
5. convert data to standard values (z-scores)
6. form and solve real-world problems, reason and communicate about mathematics using the previous indicators of performance for statistics in combination with indicators from other standards