Indiana Academic Standards for Mathematics – Algebra 2
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This Teacher Resource Guide has been developed to provide supporting materials to help educators successfully implement the Indiana Academic Standards for Algebra 2 Mathematics – Adopted April 2014. These resources are provided to help you in your work to ensure all students meet the rigorous learning expectations set by the Academic Standards. Use of these resources is optional – teachers should decide which resource will work best in their school for their students.

This resource document is a living document and will be frequently updated.
Please send any suggested links and report broken links to:
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The examples in this document are for illustrative purposes only, to promote a base of clarity and common understanding. Each example illustrates a standard but please note that examples are not intended to limit interpretation or classroom applications of the standards.

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GOOD WEBSITES FOR MATHEMATICS:
http://nlvm.usu.edu/en/nav/vlibrary.html
http://www.math.hope.edu/swanson/methods/applets.html
http://learnzillion.com
http://illuminations.nctm.org
https://teacher.desmos.com
http://illustrativemathematics.org
http://www.insidemathematics.org
https://www.khanacademy.org/
https://www.teachingchannel.org/
http://map.mathshell.org/materials/index.php
https://www.istemnetwork.org/index.cfm
http://www.azed.gov/azccrs/mathstandards/

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	Indiana Academic Standard for Mathematics Algebra 2 – Adopted April 2014	Highlighted Vocabulary Words from the Standard Defined	Specific Algebra 2 Example for the Standard	Specific Algebra 2 Electronic Resource for the Standard
Complex Numbers and Expressions				
MA.AII.CNE.1:	AII.CNE.1: Know there is an imaginary number, i, such that i^2 = -1, and every complex number can be written in the form a + bi, with a and b real. Use the relation i^2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	**Imaginary number**-the square root of a negative number, written in the form *bi* , where *b* is a real number and *I* is the imaginary unit. **Complex number-** Any number that can be written as *a +bi* , where *a* and *b* are real numbers and *i*= $\sqrt{-1}$	Find the complex numbers created by adding, subtracting, multiplying, and dividing the following complex numbers: -2 + 6*i* and 5 - 3*i*	https://www.khanacademy.org/math/algebra2/complex-numbers-a2/complex_numbers/v/algebra-ii--imaginary-and-complex-numbers http://www.letu.edu/people/stevearmstrong/Math1203/Lesson3.3.ppt
MA.AII.CNE.2:	AII.CNE.2: Translate expressions between radical and exponent form and simplify them using the laws of exponents.	**Radical expression-** An expression that contains a variable within a radical. **Exponential expression**- expression that contains a rational exponent. **Laws of exponents**- properties: product of powers, quotient of powers, power of a power, power of a product, and power of a quotient.	Simplify the following radical expression using rational exponents. Show the simplified answer in both exponent and radical form: $b^{\frac{m}{n}} = \left(\sqrt[n]{b}\right)^m = \sqrt[n]{b^m}$ $\sqrt[10]{b^8}$	http://www.algebralab.org/studyaids/studyaid.aspx?file=Algebra2_7-1.xml
MA.AII.CNE.3:	AII.CNE.3: Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide algebraic rational expressions.	**Rational expression-** An algebraic expression whose numerator and denominator are polynomials and whose denominator has a degree **Rational numbers**- a number that can be written in the form a/b where *a* and *b* are integers and b does not equal 0.	Add, subtract, multiply, and divide the following rational expressions: $\frac{2}{x^2-4}$ and $\frac{x-1}{x-2}$	https://learnzillion.com/lessonsets/154-add-subtract-multiply-and-divide-rational-expressions
MA.AII.CNE.4:	AII.CNE.4: Rewrite algebraic rational expressions in equivalent forms (e.g., using laws of exponents and factoring techniques).	**Factoring**- the process of writing a number or algebraic expression as a product.	Simplify the following rational expressions: $\frac{(-2rs^2)^2}{12r^2s^2}$ $\frac{8y^3+27}{2xy-10y+3x-15}$	http://www.cengage.com/resource_uploads/downloads/1439049084_231926.pdf
MA.AII.CNE.5:	AII.CNE.5: Rewrite rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using long division and synthetic division.	**Polynomials**- a monomial or a sum or difference of monomials. **Degree**- the degree of the term of the polynomial with the greatest degree. **Synthetic division**- a shorthand method of dividing by a linear binomial of the form (x-a) by writing only the coefficients of the polynomials.	Use long division to find the following quotient: $\frac{x^3+x^2-22x-40}{x+4}$ Confirm the quotient using synthetic division.	https://learnzillion.com/lessonsets/142-rewriting-simple-rational-expressions-in-different-forms
b does not equal 0	AII.CNE.6: Find partial sums of arithmetic and geometric series and represent them using sigma notation.	**Partial sum**- the sum of a specified number of terms *n* of a sequence whose total number of terms is greater than *n* . **Arithmetic series**- the indicated sum of the terms of an arithmetic sequence. **Geometric series**- the indicated sum of the terms of a geometric sequence. **Sigma notation**- summation notation using the Greek letter sigma to denote the sum of a sequence defined by a rule, example . $\sum_{n=1}^{k} a_n$	Find the sum of the arithmetic series. $\sum_{k=11}^{15}(3k+2)$ Find the sum of the arithmetic series. $\sum_{n=1}^{k} a_n$ $\sum_{n=1}^{8} 2(-3)^{n-1}$ $\sum_{n=1}^{k} a_n$	http://www.regentsprep.org/Regents/math/algtrig/ATP2/ArithSeqResource.htm http://www.regentsprep.org/Regents/math/algtrig/ATP2/GeoSeq.htm

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		Functions		
MA.AII.F.1:	AII.F.1: Determine whether a relation represented by a table, graph, or equation is a function.	**Relation**- a set of ordered pairs. **Function**- a relation in which every input is paired with exactly one output.	Which of the following is not a function? a.) b.) c.) $y = x^2 - 7x - 30$	http://www.regentsprep.org/Regents/math/algtrig/ATP5/Lfunction.htm
MA.AII.F.2:	AII.F.2: Understand composition of functions and combine functions by composition.	**Composition**- the composition of functions f and g, written as f(g(x)) or (f ∘ g)x and defined as f(x)uses the output of g(x) as the input for x in f(x).	Find f[g(x)] and g[f(x)] if: $f(x) = x + 4$ and $g(x) = x^2 - 3x$-28	
MA.AII.F.3:	AII.F.3: Understand that an inverse function can be obtained by expressing the dependent variable of one function as the independent variable of another, as f and g are inverse functions if and only if f(x)=y and g(y)=x, for all values of x in the domain of f and all values of y in the domain of g. Find the inverse of a function that has an inverse.	**Inverse function**- the function that results from exchanging the input and output values of a one-to-one function. The inverse of *f(x)* is denoted as $f^{-1}(x)$. **Dependent variable**- the output of a function; a variable whose value depends on the value of the input, or independent variable. **Independent variable**- the input of a function; a variable whose value determines the value of the output, or dependent variable. **Domain**- the set of all possible input values of a relation or function.	Find the inverse of the function $f(x) = \frac{2x + 3}{6}$	http://www.mathsisfun.com/sets/function-inverse.html
MA.AII.F.4:	AII.F.4: Understand that if the graph of a function contains a point (a, b), then the graph of the inverse relation of the function contains the point (b, a); the inverse is a reflection over the line y = x.	**Reflection**- a transformation that reflects, or "flips", a graph or figure across a line, called the line of reflection, such that each reflected point is the same distance from the line of reflection but is on the opposite side of the line.	Identify a point on the function $f(x) = 2^x$ What ordered pair must be on the graph of $f^{-1}(x)$	http://www.purplemath.com/modules/fcncomp.htm http://www.regentsprep.org/Regents/math/algtrig/ATP7/compositionfunctions.htm
MA.AII.F.5:	AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k).		Graph the following functions: $f(x) = x^2 + 3$ $f(x) = (x + 3)^2$ $f(x) = 3x^2$ $f(x) = (3x)^2$ How does each graph differ from the parent function $f(x) = x^2$	http://math.ucsd.edu/~wgarner/math4c/textbook/chapter2/transform_functions.htm

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System of Equations				
MA.AII.SE.1:	AII.SE.1: Solve a **system of equations** consisting of a **linear equation** and a **quadratic equation** in two variables algebraically and graphically with and without technology (e.g., find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3).	**System of equations**- a set of two or more equations that have two or more variables. **Linear equation**- an equation that can be written in the form $ax=b$, where a and b are constants and x does not equal 0 **Quadratic equation**- an equation that can be written in the form ax^2+bx+c where a, b, and c are real numbers and $a \neq 0$	Solve the following system of equations algebraically. Confirm your algebraic solution(s) by graphing. $\begin{cases} x^2 + y^2 = 64 \\ y = 7 - x \end{cases}$	http://www.regentsprep.org/Regents/math/algtrig/ATE5/QuadLinearSys.htm https://learnzillion.com/lessonsets/263-solve-simple-systems-of-equations-with-linear-and-quadratic-equations
MA.AII.SE.2:	AII.SE.2: Solve systems of two or three **linear equations** in two or three variables algebraically and using technology.		Solve the following system of equations: $\begin{cases} x + y + z = 12 \\ 6x - 2y - z = 16 \\ 3x + 4y + 2z = 28 \end{cases}$	http://www.mathwarehouse.com/algebra/linear_equation/systems-of-equation/index.php http://tutorial.math.lamar.edu/Classes/Alg/SystemsThreeVrble.aspx
MA.AII.SE.3:	AII.SE.3: Represent real-world problems using a **system of linear equations** in three variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.		Mara loves the lunch combinations at Casa Sevilla's Mexican Restaurant. Today however, she wants a different combination than the ones listed on the menu. Find the price for an enchilada, a taco, and a burrito. [Assume that the price of a combo meal is the same price as purchasing each item separately.] Menu: Two Tacos, One Burrito $6.55 One Enchilada, One Taco, One Burrito .$7.10 Two Enchiladas, Two Tacos $8.90	http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/col_alg_tut50_systhree.htm

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Quadratics Equations and Functions				
MA.AII.Q.1:	AII.Q.1: Represent real-world problems that can be modeled with quadratic functions using tables, graphs, and equations; translate fluently among these representations. Solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable.	**Quadratic function** - a function that can be written in the form $f(x) = ax^2 + bx + c$ where a, b, and c are real numbers and $a \neq 0$ or the form $f(x) = (x-a)^2 + k$ where a, h, and k, are real numbers and a does not equal zero	To avoid hitting any rocks below, a cliff diver jumps up and out. The equation $h = -16t^2 + 4t + 26$ describes her height h in feet t seconds after jumping. How long will it take for her to hit the water?	http://www.montereyinstitute.org/courses/Algebra1/COURSE_TEXT_RESOURCE/U10_L2_T1_text_container.html http://www.mathsisfun.com/algebra/quadratic-equation-real-world.html
MA.AII.Q.2:	AII.Q.2: Use completing the square to rewrite quadratic functions into the form y = a(x + h)^2 + k, and graph these functions with and without technology. Identify intercepts, zeros, domain and range, and lines of symmetry. Understand the relationship between completing the square and the quadratic formula.	**Completing the square-** a process used to form a perfect-square trinomial. **Zeros**- for the function f, any number x such that $f(x)=0$. **Range**- the set of output values of a function or relation. **Quadratic formula**- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Use the vertex form of the following function to generate its graph. $f(x) = 2x^2 - 3x - 3$ What are the key features of the graph? Which key features do you see in the vertex form? Find the zeros of the function from its standard form (i.e. using Quadratic Formula) and its vertex form.	http://www.youtube.com/watch?v=xGOQYTo9AKY
MA.AII.Q.3:	AII.Q.3: Use the discriminant to determine the number and type of solutions of a quadratic equation in one variable with real coefficients; find all solutions and write complex solutions in the form of a ± bi for real numbers a and b.	**Discriminant**- the discriminant of the quadratic equation $ax^2 + bx + c = 0$ is $b^2 - 4ac$ **Real number**- a rational or irrational number. Every point on the number line represents a real number.	Solve the following equations using the Quadratic Formula: $15x^2 - 7x - 4 = 0$ $-5x^2 + 8x = 1$ $2x^2 + 16x + 33 = 0$ $-12x + 9x^2 + 4 = 0$ $ax^2 + bx + c = 0$ $a \neq 0$ In each solving process, identify the point along the way where you can tell how many *and* what type of solutions the equation has.	http://www.mathwarehouse.com/quadratic/discriminant-in-quadratic-equation.php http://www.regentsprep.org/Regents/math/algtrig/ATE3/discriminant.htm

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Exponential & Logarithmic Equations and Functions				
MA.AII.EL.1:	AII.EL.1: Write arithmetic and geometric sequences both recursively and with an explicit formula; use them to model situations and translate between the two forms.	**Arithmetic sequence**- a sequence whose successive terms differ by the same nonzero number *d* , called the *common difference* . **Geometric sequence**- a sequence in which the ratio of successive terms is a constant *r* , called the *common ratio* , where r does not equal 0 or 1 **Recursive formula**- a formula for a sequence in which one or more previous terms are used to generate the next term. **Explicit formula**- a formula that defines the *n* th term a_n, or general term, of a sequence as a function of *n* .	Write two rules for each of the sequences below. The rule will be used to calculate the value of the *n* th term of the sequence. 6, 14, 22, 30, … 6, 18, 54, 162, … [Hint: One rule should use previous terms. The second rule should be in terms of *n* .]	http://www.regentsprep.org/Regents/math/algtrig/ATP3/Recursive.htm http://home.windstream.net/okrebs/page131.html
MA.AII.EL.2:	AII.EL.2: Graph exponential functions with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, and asymptotic and end behavior.	**Exponential function**- a function of the form $f(x) = ab^x$ where *a* and *b* are real numbers with a not equal to 0 and b greater than 0 but not equal to 1 **Asymptote**- a line that a graph approaches as the value of a variable becomes extremely large or small. **End behavior**- the trends in the *y* -values of a function as the *x* -values approach positive and negative infinity.	Graph the following exponential functions. $y = 2(3)^x$ $y = 2(3)^{-x}$ $y = -2(3)^x$ $y = -2\left(\frac{1}{3}\right)^x$ Identify and describe the key features of each curve. Key features include, but are not limited to: intercepts, zeros, domain, range, asymptotes, end behavior.	http://www.purplemath.com/modules/graphexp.htm https://www.khanacademy.org/math/algebra/algebra-functions/graphing_functions/v/graphing-exponential-functions
MA.AII.EL.3:	AII.EL.3: Identify the percent rate of change in exponential functions written as equations, such as y = (1.02)^t, y = (0.97)^t, y = (1.01)12^t, y = (1.2)^t/10, and classify them as representing exponential growth or decay.	**Percent rate of change**- a growth or decay can be modeled by a constant percent increase or decrease with the formula: $A(t) = a(1 \pm r)^t$ **Exponential growth**- an exponential function of the form $f(x) = ab^x$ in which $b > 1$. If *r* is the rate of growth, then the function can be written $A(t) = a(1 + r)^t$ where *a* is the initial amount and *t* is the time. **Exponential decay**- an exponential function of the form $f(x) = ab^x$ in which $0 < b < 1$ If *r* is the rate of decay, then the function can be written A(t) = a(1 - r)t , where *a* is the initial amount and *t* is the time.	Identify the percent rate of change in each of the following exponential equations. Classify each one as exponential growth or exponential decay. $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{-12t}$, $y = (1.2)^{t/10}$	http://www.letu.edu/people/stevearmstrong/Math1203/Lesson5.3.ppt http://www.regentsprep.org/regents/math/algebra/ae7/expdecayl.htm
MA.AII.EL.4:	AII.EL.4: Use the properties of exponents to transform expressions for exponential functions (e.g., the expression 1.15^t can be rewritten as (1.15^1/12)^12t ≈ 1.012^12t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%).		Write an equation, in terms of *t* , that can be used to find total money owed by a borrower if their loan amount was $1000 and interest was calculated at 15% annually. Rewrite your equation if the interest owed was compounded monthly.	http://education-portal.com/academy/topic/common-core-hs-algebra-exponents-and-exponential-functions.html
MA.AII.EL.5:	AII.EL.5: Know that the inverse of an exponential function is a logarithmic function. Represent exponential and logarithmic functions using graphing technology and describe their inverse relationship.	**Logarithmic function**- a function of the form $f(x) \log_b x$ where b does not equal to 0 and $b > 0$, which is the inverse of the exponential function $f(x) = b^x$	Graph the following equation and its inverse: $y = 10^x$ Describe the relationship of the two graphs.	http://www.regentsprep.org/Regents/math/algtrig/ATP8b/exponentialFunction.htm http://www.mathstat.strath.ac.uk/basicmaths/232_inverseofexponentialfunctions.html

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MA.AII.EL.6:	AII.EL.6: Use the laws of exponents to derive the laws of logarithms. Use the laws of logarithms and the inverse relationship between exponential functions and logarithms to evaluate expressions and solve equations in one variable.	**Laws of logarithms** - properties: product , quotient, power, inverse, and the change of base formula.	Solve the following logarithmic equation: $log_{10}z + log_{10}(z+2) = 1$	http://oakroadsystems.com/math/loglaws.htm http://www.es.ucsc.edu/~pkoch/EART_110A/Labs/Exponential%20&%20Logarithmic%20Rules.pdf
MA.AII.EL.7:	AII.EL.7: Represent real-world problems using exponential equations in one or two variables and solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable.	**Exponential equation**- an equation that contains one or more exponential expressions.	The Martins bought a condominium for $85,000. Assuming that the value of the condo will appreciate at most 5% a year, how much will the condo be worth in 5 years?	http://www.regentsprep.org/Regents/math/algtrig/ATP8b/ExamplesexponentialFunction.htm http://www.algebralab.org/lessons/lesson.aspx?file=Algebra_ExponentsApps.xml
Polynomial, Rational, and Other Equations and Functions				
MA.AII.PR.1:	AII.PR.1: Solve real-world and other mathematical problems involving polynomial equations with and without technology. Interpret the solutions and determine whether the solutions are reasonable.	**Polynomial equation**- an equation that contains a monomial or a sum or difference of monomials.	The Taylor Manufacturing Company makes open metal boxes of various sizes. Each sheet of metal is 50 inches long and 32 inches wide. To make a box, a square is cut from each corner. Write an equation for the volume of the box. Solve the equation to find the dimensions of the box.	http://new.sac.edu/facultystaff/HomePages/KrystalMeier/Documents/Math%2060%2080%20fast%20track%20stuff/Math60-80worksheetsolvingpolynApplications.pdf http://education.ti.com/~/media/70368633E690479EB60909373B98ECF9
MA.AII.PR.2:	AII.PR.2: Graph relations and functions including polynomial, square root, and piecewise-defined functions (including step functions and absolute value functions) with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, end behavior, and lines of symmetry.	**Polynomial function**- a function whose rule is a polynomial. **Square-root function**- a function whose rule contains a variable under a square-root sign. **Piecewise function**- a function that is a combination of one or more functions. **Step function**- a piecewise function that is constant over each interval in its domain. **Absolute-value function**- a function whose rule contains absolute-value expressions.	Identify each table of values as a type of function. x f(x): -5 7; -3 5; -1 3; 0 2; 1 3; 3 5; 5 7; 7 9 x f(x): -5 24; -3 8; -1 0; 0 -1; 1 0; 3 8; 5 24; 7 48 x f(x): -1.3 -1; -1.7 -1; 0 1; 0.8 1; 0.9 1; 1 2; 1.5 2; 2.3 3 x f(x): -5 undef; -3 undef; -1 undef; 0 0; 1 1; 4 2; 9 3; 16 4	http://www.mathsisfun.com/sets/functions-piecewise.html
MA.AII.PR.3:	AII.PR.3: Solve real-world and other mathematical problems involving rational and radical function, including direct, inverse, and joint variation. Give examples showing how extraneous solutions may arise.	**Rational function**- a function whose rule can be written as a rational expression. **Radical function**- a function whose rule contains a variable within a radical. **Direct variation**- a linear relationship between two variables, x and y, that can be written in the form $y=kx$, where k is a nonzero constant. **Inverse variation**- a relationship between two variables, x and y that can be written in the form y = k/x where k is a nonzero constant and x cannot equal to 0 **Extraneous solution-** a solution of a derived equation that is not a solution of the original equation.	Solve the following equations: $\frac{3}{b^2+5b+6} + \frac{b-1}{b+2} = \frac{7}{b+3}$ $\sqrt{x-15} = 3 - \sqrt{x}$ Boyle's law state that when a sample of gas is kept at a constant temperature, the volume varies inversely with the pressure exerted on it. Write an equation for Boyle's Law that expresses the variation in volume V as a function of pressure P.	https://braingenie.ck12.org/subjects/104 http://classroom.synonym.com/radical-expressions-rational-exponents-used-real-life-2876.html

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Data Analysis, Statistics, and Probability				
MA.AII.DSP.1:	AII.DSP.1: Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	**Sample survey**- a random sampling of subjects from a population. **Experiments**- a study where something is intentionally done to people, animals, or objects, and then the response is observed. **Observational study**- a study where individuals are observed and no attempt is made to influence the results. **Randomization**- to order or select in a random manner, as in a sample, random way in order to enhance the statistical validity of any results obtained.		https://www.illustrativemathematics.org/HSS-IC.B
MA.AII.DSP.2:	AII.DSP.2: Use technology to find a linear, quadratic, or exponential function that models a relationship for a bivariate data set to make predictions; compute (using technology) and interpret the correlation coefficient.	**Bivariate data**- data that has two variables for each observation. The quantities are often represented in a scatter plot. **Correlation coefficient**- a number r, where $-1 \leq 0 \leq 1$, that describes how closely the points in a scatter plot cluster around the least-squares line.		http://mathbits.com/MathBits/TISection/Statistics2/correlation.htm http://www.socscistatistics.com/tests/pearson/
MA.AII.DSP.3:	AII.DSP.3: Organize, graph (e.g., line plots and box plots), and compare univariate data of two or more different data sets using measures of center (mean and median) and spread (range, inter-quartile range, standard deviation, percentiles, and variance). Understand the effects of outliers on the statistical summary of the data.	**Box-and -whisker plot**- shows the spread of a data set in 5 key points: the minimum and maximum values, the median, and the first and third quartiles. **Univariate data**- data that has one variable and does not deal with causes or relationships. **Mean**- the sum of all the values in a data set divided by the number of data values. **Median**- for an ordered data set with an odd number of values, the median is the middle value. For an ordered data set with an even number of values, the median is the average of the two middle values. **Range**- the difference of the greatest and least values in the data set. **Interquartile range** (IQR), the difference of the third(upper) and first (lower) quartiles in a data set, representing the middle half of the data. **Standard deviation**- a measure of dispersion of a data set. The standard deviation is the square root of the variance. **Percentile**- describes what percent of the data were at or below a given level. **Variance**- the average of squared differences from the mean. **Outlier** - a data value that is far removed from the rest of the data.		http://www.austintown.k12.oh.us/~aust_hmw/08-09/algebra/2009-11-10%20Measures%20of%20Center%20&%20Spread.pdf http://www.stat.berkeley.edu/~bradluen/stat2/lecture6.pdf

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MA.AII.DSP.4:	AII.DSP.4: Record multiple observations (or **simulated samples**) of random events and construct **empirical models** of the **probability distributions**. Construct a **theoretical model** and apply the **law of large numbers** to show the relationship between the two models.	**Simulation**- the use of a probability experiment to mimic a real-life situation. **Empirical model-** based on a study of data without the use of any mathematical model. **Theoretical model**-based on theories rather than data. **Law of large numbers-** the tendency of experimental probability to approach theoretical probability as the number of trials gets very large.		http://www.epixanalytics.com/modelassist/CrystalBall/ModelAssist.htm#Distributions/Creating_your_own_distributions/Method_3.htm http://www.math.tamu.edu/~phoward/m442/modprob.pdf
MA.AII.DSP.5:	AII.DSP.5: Understand **dependent** and **independent events**, and **conditional probability**; apply these concepts to calculate **probabilities**.	**Dependent events**- events for which the occurrence or nonoccurrence of one event affects the probability of the other event. **Independent events**- events for which the occurrence or non-occurrence of one event does not affect the probability of the other event. **Conditional probability**- the probability of event B, given the event A has already occurred or is certain to occur, denoted P(B | A) ; used to find probability of dependent events. **Probability**- a number from 0 to 1 (or 0% to 100%) that is the measure of how likely an event is to occur.		http://www.cut-the-knot.org/Probability/IndependentEvents.shtml http://www.regentsprep.org/regents/math/algebra/apr3/lconditional.htm
MA.AII.DSP.6:	AII.DSP.6: Understand the **multiplication counting principle**, **permutations**, and **combinations**; apply these concepts to calculate **probabilities**.	**Counting principal**- if one event has *m* possible outcomes and second independent event has *n* possible outcomes, then there are *m* x *n* total possible outcomes for the two events together. **Permutation**- an arrangement of a group of objects in which order is important. **Combination**- a selection of a group of objects in which order is not important.		http://dmc122011.delmar.edu/math/pjohnson/Webpage/businessmath/notes/9.2.pdf http://www.youtube.com/watch?v=repIll61Q-A