



HUDSONVILLE HIGH SCHOOL COURSE FRAMEWORK



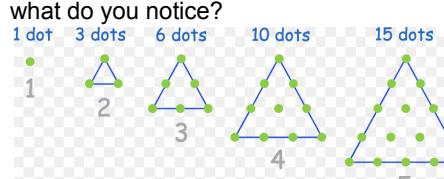
Course: Algebra 2 Concepts- B

KEY COURSE OBJECTIVES/ENDURING UNDERSTANDINGS (Important ideas and core processes)	OVERARCHING/ESSENTIAL SKILLS OR QUESTIONS (ideas/skills that transcend discipline-specific learning)
Exponential Functions	Make sense of problems and persevere in solving them.
Radical Functions	Reason abstractly and quantitatively.
Mathematical Sequences	Construct viable arguments and critique the reasoning of others.
Probability	Model with mathematics.
Data Analysis and Stats	Use appropriate tools strategically.
Trigonometry	Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning.

UNIT 6 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS
Exponential Growth and Decay Functions	6.1	CCSS.MATH.CONTENT.HSA.APR.D.6 CCSS.MATH.CONTENT.HSF.IF.C.7.E CCSS.MATH.CONTENT.HSF.LE.A.3	6.1a I can graph exponential growth functions 6.1b I can graph exponential decay functions 6.1c I can explain what a and b are in $y = a * b^x$ 6.1d I can determine whether it is an exponential growth or decay problem 6.1e I can give examples of exponential growth problems 6.1f I can give examples of exponential decay problems	1. Determine what the initial amount is in the following exponential model. $y = 2(4)^x$ 2. Determine what the common ratio is for the following exponential model. $y = 2(4)^x$ 3. Determine whether the function represents exponential growth or decay. $y = 2(4)^x$	Graphing, Analyzing and interpreting exponential functions
The Natural Base, e	6.2	CCSS.MATH.CONTENT.HSA.APR.D.6 CCSS.MATH.CONTENT.HSA.APR.D.7 CCSS.MATH.CONTENT.HSF.LE.A.3	6.2a I can explain what e is 6.2b I can solve compound interest problems 6.2c I can solve problems that involve compound continuously	1. Aidan has \$7565 in his checking account. He invests \$5000 of it in an account that earns 3.5% interest compounded continuously. What is the total amount of his investment after 3 years? 2. Aidan has \$7565 in his checking account. He invests \$5000 of it in an account that earns 3.5% interest compounded quarterly. What is the total amount of his investment after 6 years?	Real life application of exponential functions
Solving Exponential Equations	6.3	CCSS.MATH.CONTENT.HSF.IF.C.8.B	6.3a I can solve exponential equations by getting common bases	1. Solve: $3^{4x} = 3^{12}$ 2. Solve: $49^{x-2} = 343$	Solving exponential equations

Modeling with Exponential Functions	6.4	CCSS.MATH.CONTENT.HSF.IF.C.9 CCSS.MATH.CONTENT.HSF.LE.A.3	<p>6.4a I can determine whether a table represents an exponential function or not</p> <p>6.4b I can use regression to get an exponential model</p>	<p>1. Determine whether or not the table represents an exponential model.</p> <table border="1" data-bbox="1246 195 1657 277"> <thead> <tr> <th>x</th><th>-2</th><th>-1</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th></tr> </thead> <tbody> <tr> <th>y</th><td>0.5</td><td>1</td><td>2</td><td>4</td><td>8</td><td>16</td><td>32</td></tr> </tbody> </table> <p>2.</p> <p>EXAMPLE 3 Finding an Exponential Model</p> <p>A store sells trampolines. The table shows the numbers y of trampolines sold during the xth year that the store has been open. Write a function that models the data.</p> <table border="1" data-bbox="1267 440 1404 620"> <thead> <tr> <th>Year, x</th><th>Number of trampolines, y</th></tr> </thead> <tbody> <tr> <td>1</td><td>12</td></tr> <tr> <td>2</td><td>16</td></tr> <tr> <td>3</td><td>25</td></tr> <tr> <td>4</td><td>36</td></tr> <tr> <td>5</td><td>50</td></tr> <tr> <td>6</td><td>67</td></tr> <tr> <td>7</td><td>96</td></tr> </tbody> </table>	x	-2	-1	0	1	2	3	4	y	0.5	1	2	4	8	16	32	Year, x	Number of trampolines, y	1	12	2	16	3	25	4	36	5	50	6	67	7	96	Modeling with mathematics
x	-2	-1	0	1	2	3	4																														
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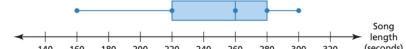
UNIT 7 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS
nth Roots and Rational Exponents	7.1	CCSS.MATH.CONTENT.HSN.RN.A.1	7.1a Find the nth root of numbers 7.1b Evaluate expressions with rational exponents 7.1c Solve equations using the nth root	1. Find the nth root of a $n = 2, a = 25$ 2. Simplify the following: $25^{\frac{1}{2}}$ 3. Solve $9x^2 - 4 = 59$	Simplifying Exponents
Properties of Rational Exponents and Radicals	7.2	CCSS.MATH.CONTENT.HSN.RN.A.1 CCSS.MATH.CONTENT.HSN.RN.A.2	7.2a Use properties of rational exponents to simplify expressions 7.2b Use properties of radicals to simplify expressions	1. Simplify the following: a. $\frac{1}{5-\sqrt{2}}$ b. $\sqrt{2} * \sqrt{8}$	Simplifying Exponents and Radical Expressions
Graphing Radical Functions	7.3	CCSS.MATH.CONTENT.HSF.IF.C.7.B	7.3a Graph the Square Root Function 7.3b Graph the Cube Root Function	1. Write the following for the Parent Function of the Square Root family. Equation: Graph: Domain: Range: 2. Write the following for the Parent Function of the Cube Root family. Equation: Graph: Domain: Range:	Graphing and analyzing radical functions
Solving Radical Equations	7.4	CCSS.MATH.CONTENT.HSA.REI.A.2	7.4a I can solve radical equations 7.4b I can identify extraneous solutions	Solve the following radical equations: $\sqrt[3]{x-14} = -2$	Solving radical equations

UNIT 8 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS
Looking at and Determining Patterns	8.1	CCSS.MATH.CONTENT.HSF.LE.A.1	8.1a I can identify patterns in number sequences 8.1b I can find the next term in a number sequence based on the pattern	Observe the pattern. What do you see, what do you notice? 	Identifying patterns visually
Types of Mathematical Sequences	8.2	CCSS.MATH.CONTENT.HSF.LE.A.1	8.2a I can determine whether a sequence is arithmetic or not 8.2b I can determine whether a sequence is geometric or not 8.2c I can determine if the pattern is not arithmetic or geometric	1. Determine whether the sequence could be arithmetic. If so, find the common difference and the next term. a. $-10, -4, 2, 8, 14, \dots$ 2. Determine whether the sequence could be geometric. If possible, find the common ratio. a. $100, 93, 86, 79, \dots$	Identifying patterns mathematically. Distinguishing between arithmetic and geometric sequences
Explicit Formula for Arithmetic Sequences	8.3	CCSS.MATH.CONTENT.HSF.BF.A.1.A CCSS.MATH.CONTENT.HSF.BF.A.2	8.3a I can write an explicit rule for the n th term of an arithmetic sequence 8.3b I can find the n th term for an arithmetic sequence	Write a rule (Explicit Formula) for the n th term of the arithmetic sequence. Then, find a_{25} . a. $20, 14, 8, 2, -4, \dots$	Expressing arithmetic sequences with mathematical explicit equations
Recursive Formula for Arithmetic Sequences	8.4	CCSS.MATH.CONTENT.HSF.BF.A.1.A CCSS.MATH.CONTENT.HSF.BF.A.2	8.4a I can write the first few terms of an arithmetic sequence given the recursive formula 8.4b I can write a recursive rule for the arithmetic	Write a recursive rule for the following arithmetic or geometric sequences. 18, 14, 10, 6, 2, -2, ...	Expressing arithmetic sequences with mathematical recursive equations

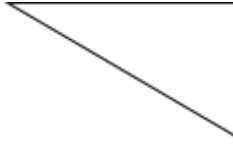
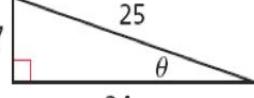
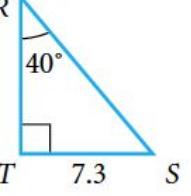
			<p>sequence from the list of numbers</p> <p>8.4c I can write the recursive rule for an arithmetic sequence given the explicit rule</p>		
Explicit Formula for Geometric Sequences	8.5	CCSS.MATH.CONTENT.HSF.BF.A.1.A CCSS.MATH.CONTENT.HSF.BF.A.2	<p>8.5a I can write an explicit rule for the nth term of a geometric sequence</p> <p>8.5b I can find the nth term for a geometric sequence</p>	Write a rule (Explicit Formula) for the n th term of the geometric sequence. Then, find g_8 . a. 3, 12, 48, 192, ...	Expressing geometric sequences with mathematical explicit equations
Recursive Formula for Geometric Sequences	8.6	CCSS.MATH.CONTENT.HSF.BF.A.1.A CCSS.MATH.CONTENT.HSF.BF.A.2	<p>8.6a I can write the first few terms of a geometric sequence given the recursive formula</p> <p>8.6b I can write a recursive rule for the geometric sequence from the list of numbers</p> <p>8.6c I can write the recursive rule for a geometric sequence given the explicit rule</p>	Write a recursive rule for the following arithmetic or geometric sequences. 3, 6, 12, 24, 48, 96, ...	Expressing geometric sequences with mathematical recursive equations

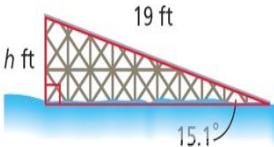
UNIT 9 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS
Sample Space and Probability	9.1	CCSS.MATH.CONTENT.HSS.CP.A.1 CCSS.MATH.CONTENT.HSS.CP.A.3 CCSS.MATH.CONTENT.HSS.CP.B.6	9.1a I can find the sample space of an event 9.1b I can find theoretical probability of an event 9.1c I can find experimental probability of an event 9.1d I can find the geometric probability of an event 9.1e I can tell if an event is impossible, unlikely, likely, or certain to occur	1. In an experiment, three pennies are flipped. List the possible outcomes to generate the sample space. 2. Each letter of the word PROBABLE is written on a separate card. The cards are placed face down and mixed up. What is the probability that a randomly selected card has a consonant? 3. <i>Determine whether the event is impossible, unlikely, likely, or certain.</i> A) You rolling a 12 with 2 die	Sample space, experimental and theoretical probability
Independent and Dependent Events	9.2	CCSS.MATH.CONTENT.HSS.CP.A.2 CCSS.MATH.CONTENT.HSS.CP.B.7 CCSS.MATH.CONTENT.HSS.CP.B.8	9.2a I can determine whether events are independent or dependent 9.2b I can find probabilities of independent events 9.2c I can find probabilities of dependent events 9.2d I can find missing probability using the formula	1. <i>Determine the Sample Space of an Event Occuring</i> a. In an experiment, three pennies are flipped. List the possible outcomes to generate the sample space. 2. You are trying to guess a three letter password that uses only the letter A, E, I, O, U. Letters can be used more than once. Find the probability that you pick the correct password "AIE" 3. What if it's the same question, but letters cannot be used more than once.	Independent and dependent events and probability

Permutations and Combinations	9.3	CCSS.MATH.CONTENT. HSS.CP.B.9	<p>9.3a I can use the fundamental counting principle</p> <p>9.3b I can evaluate the combination and permutation expression</p> <p>9.3c I can apply and calculate combinations for real life situations</p> <p>9.3d I can apply and calculate permutations for real life situations</p>	<p>A password for a site consists of 4 digits followed by 2 letters. The letters A and Z are not used, and each digit or letter may be used more than once. How many unique passwords are possible?</p> <p>How many ways can a student government select a president, vice president, secretary, and treasurer from a group of 6 people?</p> <p>There are 12 different-colored cubes in a bag. How many ways can Randall draw a set of 4 cubes from the bag?</p>	Counting principle, permutations, and combinations
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UNIT 10 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS										
Measures of Center and Variation	10.1	CCSS.MATH.CONTENT.HSS.ID.A.4	<p>10.1a I can name the different types of measures of center</p> <p>10.1b I can find the mean of a data set</p> <p>10.1c I can find the median of a data set</p> <p>10.1d I can find the mode of a data set</p> <p>10.1e I can name the different types of measures of variation</p> <p>10.1f I can find the range of a data set</p> <p>10.1g I can find the standard deviation of a data set</p>	<table border="1" data-bbox="1241 306 1537 507"> <tr> <th colspan="2">Students' Hourly Wages</th> </tr> <tr> <td>\$16.50</td> <td>\$8.25</td> </tr> <tr> <td>\$8.75</td> <td>\$8.45</td> </tr> <tr> <td>\$8.65</td> <td>\$8.25</td> </tr> <tr> <td>\$9.10</td> <td>\$9.25</td> </tr> </table> <p>A) Find the mean, median, and mode of the data.</p> <p>B) Which measure of center best represents the data?</p> <p>C) Identify the Outlier.</p> <p>D) How does the outlier affect the mean, median, and mode.</p> <p>E) Describe a possible explanation for the outlier in this situation?</p> <p>F) Find the range</p> <p>G) Find the standard deviation</p>	Students' Hourly Wages		\$16.50	\$8.25	\$8.75	\$8.45	\$8.65	\$8.25	\$9.10	\$9.25	Analyzing data sets
Students' Hourly Wages															
\$16.50	\$8.25														
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\$9.10	\$9.25														
Box and Whisker Plots	10.2	CCSS.MATH.CONTENT.HSS.ID.A.1 CCSS.MATH.CONTENT.HSS.ID.A.2 CCSS.MATH.CONTENT.HSS.ID.A.3	<p>10.2a I can make a box and whisker plot for a data set</p> <p>10.2b I can determine the shape of the data (skewed or not)</p> <p>10.2c I can explain what an outlier is</p> <p>10.2d I can determine the outlier of a data set</p> <p>10.2e I can determine the IQR of a data set</p>	<p>1. Make a Box and Whisker Plot for the following data set. 24,30,30,22,35,22,18,25,28,30,25,27</p> <p>2.</p> <p><i>Example:</i> The box and whisker plot represents the lengths (in seconds) of the songs played by a rock band at a concert.</p>  <p>Find and interpret the range and IQR of the data set above.</p> <p>3. Describe the shape of the following data set.</p>	Analyzing and creating box and whisker plots										

				<p>Example: The box and whisker plot represents the lengths (in seconds) of the songs played by a rock band at a concert.</p>																
Two Way Tables	10.3	CCSS.MATH.CONTENT.HSS.ID.A.1 CCSS.MATH.CONTENT.HSS.ID.B.5 CCSS.MATH.CONTENT.HSS.CP.A.4	10.3a I can determine whether a data set represents qualitative or quantitative data 10.3b I can create a two-way table to represent data 10.3c I can use a two-way table to interpret information about a data set	Use the Two-Way Table to answer the following questions. How many freshmen were surveyed? How many sophomores were surveyed? How many students buy lunch at school? How many students do not buy lunch at school? <table border="1" style="margin-top: 20px;"> <thead> <tr> <th colspan="2"></th> <th colspan="2">Buy Lunch at School</th> </tr> <tr> <th colspan="2"></th> <th>Yes</th> <th>No</th> </tr> <tr> <th rowspan="2">Class</th> <th>Freshman</th> <td>92</td> <td>86</td> </tr> </thead> <tbody> <tr> <th>Sophomore</th> <td>116</td> <td>52</td> </tr> </tbody> </table>			Buy Lunch at School				Yes	No	Class	Freshman	92	86	Sophomore	116	52	Analyzing and creating two-way tables
		Buy Lunch at School																		
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Class	Freshman	92	86																	
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UNIT 11 (pacing= 2 days per lesson)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to. . .)	EXAMPLES	KEY CONCEPTS
Pythagorean Theorem	11.1	CCSS.MATH.CONTENT.HSG.SRT.B.4	11.1a I can explain what Pythagorean Theorem is 11.1b I can use the Pythagorean theorem to find a missing side length of a right triangle	<p>A 24 foot wire is attached to an electrical pole. If the pole is 20 feet tall, how far is the wire sitting from the base of the pole? Round answers to the nearest tenth of a foot.</p> 	Right triangle trigonometry
Sine, Cosine, and Tangent	11.2	CCSS.MATH.CONTENT.HSF.TF.B.7	11.2a I can explain what sine, cosine, and tangent are. 11.2b I can explain what SOH CAH TOA stands for 11.2c I can use SOH CAH TOA to find a missing side length of a right triangle 11.2d I can use my calculator to get sin cos and tan of specific angles 11.2e I can use inverse sine, cosine, and tangent to find the missing angle of a triangle.	<ol style="list-style-type: none"> Find the value of the <i>sine</i>, <i>cosine</i>, and <i>tangent</i> functions for θ.  <i>Find \overline{RS} using Trigonometry</i>  <i>Use your calculator to find the trig ratio as a decimal</i> $\sin 40^\circ$ <i>Find the unknown angle by using Inverse trig relations. (calculator needed)</i> $\sin \theta = .966$ 	Right triangle trigonometry

Real World Examples of Right Triangle Trigonometry	11.3	CCSS.MATH.CONTENT. HSG.SRT.C.8	11.3a I can solve real world problems involving right triangle trig.	In a water skiing competition, a jump ramp has the measurements shown. To the nearest foot, what is the height h above water that a skier leaves the ramp? 	Right triangle trigonometry
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