



HUDSONVILLE HIGH SCHOOL COURSE FRAMEWORK



COURSE/SUBJECT: Algebra IA

KEY COURSE OBJECTIVES/ENDURING UNDERSTANDINGS (Important ideas and core processes)	OVERARCHING/ESSENTIAL SKILLS OR QUESTIONS (ideas/skills that transcend discipline-specific learning)
SOLVING LINEAR EQUATIONS SOLVING LINEAR INEQUALITIES GRAPHING LINEAR FUNCTIONS WRITING LINEAR FUNCTIONS SOLVING SYSTEMS OF LINEAR EQUATIONS EXPONENTIAL FUNCTIONS AND SEQUENCES	Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Construct viable arguments and critique the reasoning of others. Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. Look for and express regularity in repeated reasoning.

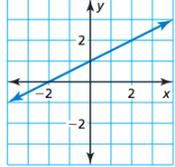
UNIT PACING (names of units and approximate pacing)	LESSON #	STANDARD (Which standards does this address?)	UNIT LEARNING TARGETS (By the end of the unit, students will be able to...)	Examples	Key Concept
SOLVING LINEAR EQUATIONS	1.1	HSA-CED.A.1 HSA-REI.A1 HSA-REI.B3	...solve simple equations.	Solve $x + 5 = 8$	inverse operations
SOLVING LINEAR EQUATIONS	1.2	HSN-Q.A.1 HSA-CED.A.1 HSA-REI.B.3	... solve multi-step equations.	Solve $9x + 2 = 21$	Equation, solution, properties of equality including: addition, subtraction, multiplication, & division
SOLVING LINEAR EQUATIONS	1.3	HSA-CED.A.1 HSA-REI.B.3	... solve multi-step equations with variables on both sides of the equation	Solve $3x + 15 - 9 = 2(x + 2)$	Equation, solution, properties of equality including: addition, subtraction, multiplication, & division

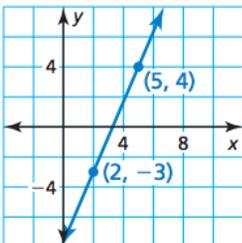
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SOLVING LINEAR EQUATIONS	1.4	HSA-CED.A.1 HSA-REI.B3	... solve absolute value equations	Solve $ x - 5 = 10$.	
SOLVING LINEAR EQUATIONS	1.5	HSA-CED.A4	... solve an equation for another variable ... solve linear equations for a given variable with coefficients represented by letters	Solve $F = \frac{9}{5}C + 32$ for C.	Formulas, literal equation

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SOLVING LINEAR INEQUALITIES	2.1	HSA-CED.A1	... write linear inequalities ... sketch the graph of linear inequalities ... write linear inequalities from graphs	Write each inequality. The sum of a number and 4 is greater than or equal to 12.	Inequality, solution of an inequality, solution set, graph of an inequality

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SOLVING LINEAR INEQUALITIES	2.2	HSA-CED.A.1 HSA-REI.B3	... solve inequalities using addition ... solve inequalities using subtraction ... use inequalities to solve real-life problems	Solve and graph $d - 3 \geq -6$	Inequality, equivalent inequalities
SOLVING LINEAR INEQUALITIES	2.3	HSA-CED.A.1 HSA-REI.B3	... solve inequalities using multiplication ... solve inequalities using division ... use inequalities to solve real-life problems	Solve and graph $\frac{p}{-4} < 1$	Inequality, equivalent inequalities
SOLVING LINEAR INEQUALITIES	2.4	HSA-CED.A.1 HSA-REI.B3	... solve multi-step inequalities ... use multi-step inequalities to solve real-life problems	Solve and graph $-3x + 4x < 2(x + 6)$	Inequality, equivalent inequalities
SOLVING LINEAR INEQUALITIES	2.5	HSA-CED.A.1 HSA-REI.B3	... write and graph compound inequalities ... solve compound inequalities ... use compound inequalities to solve real-life problems	Solve and graph $-12 < 2x + 3 \leq 16$ Solve and graph $3x - 1 < 14$ or $2x \geq 18$	Compound inequalities

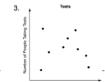
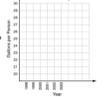
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SOLVING LINEAR INEQUALITIES	2.6	HSA-CED.A.1 HSA-REI.B3	... solve absolute value inequalities ... use absolute value inequalities to solve real-life problems	Solve $ 3x - 4 > 8$	Absolute value inequality, absolute deviation

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GRAPHING LINEAR FUNCTIONS	3.1	HSF-IF.A1	... identify domain and range ... understand 1 to 1 correspondence. ... determine if given data is a function.	<p>Express each relation as a table, as a graph, and as a mapping diagram.</p> <p>1. $\{(0, 3), (-2, 1), (1, -1), (4, -3)\}$</p>  <p>Give the domain and range of each relation. Tell whether the relation is a function. Explain.</p> <p>3.  4.  5. <table border="1" data-bbox="1619 565 1661 621"> <tr><td>x</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>y</td><td>2</td><td>3</td><td>4</td></tr> </table></p>	x	1	2	3	y	2	3	4	Domain and range		
x	1	2	3												
y	2	3	4												
GRAPHING LINEAR FUNCTIONS	3.2	HSA-CED.A2 HSA-REI.D.10 HSF-IF.B.5 HSF-IF.C.7a HSF-LE.A.1b	...identify linear functions. ...determine the difference between discrete & continuous graphs.	<p>Determine if the following is linear or non-linear & state the domain & range.</p> <p>1. </p> <p>3. <table border="1" data-bbox="1444 1068 1661 1125"> <tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>y</td><td>3</td><td>5</td><td>7</td><td>9</td></tr> </table></p>	x	0	1	2	3	y	3	5	7	9	linear & non-linear functions, discrete & continuous graphs
x	0	1	2	3											
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GRAPHING LINEAR FUNCTIONS	3.3	HSA-CED.A.2 HSF-IF.A.1 HSF-IF.A.2 HSF-IF.C.7a HSF-IF.C.9	... understand function notation. ... evaluate functions for inputs in the domains. ... interpret function in applications. ... give a reasonable domain and range.	<p>Determine a relationship between the x- and y-values. Write an equation.</p> <p>1. <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>x</td><td>-4</td><td>-3</td><td>-2</td><td>-1</td></tr><tr><td>y</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr></table></p> <p>2. $(2, 3), (3, 5), (4, 7), (5, 9)$</p> <p>Evaluate each function for the given input values.</p> <p>7. For $f(x) = 5x - 1$, find $f(3)$ when $x = 2$ and when $x = 3$.</p> <p>10. An aerobics class is being offered once a week for 6 weeks. The registration fee is \$15 and the cost for each class attended is \$10. Write a function rule to describe the total cost of the class. Find a reasonable domain and range for the function.</p> <p>5. Carson charges \$7 per hour for yard work.</p>	x	-4	-3	-2	-1	y	-1	0	1	2	Function notation
x	-4	-3	-2	-1											
y	-1	0	1	2											
GRAPHING LINEAR FUNCTIONS	3.4	HSA-CED.A.2 HSF-IF.C.7a	...identify x & y intercepts from an equation. ...graph linear equations in standard form.	Identify the intercepts & graph the equation of $2x - y = 4$	x & y intercepts, standard form										
GRAPHING LINEAR FUNCTIONS	3.5	HSA-CED.A.2 HSF-IF.B.4 HSF-IF.C.7a HSF-LE.B.5	...calculate slope from given points & a graph. ...graph linear equations in slope-intercept form.	<p>Find the slope of</p>  <p>Identify the slope & y-intercept of $x + 4y = -10$</p>	slope, y -intercept, slope-intercept form										

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GRAPHING LINEAR FUNCTIONS	3.6	HSF-IF.C.7a HSF-BF.B.3	...describe transformations/changes of graphs of linear functions.	Describe the transformation from $f(x)=3x+1$ to $g(x)=f(x)-2$.	transformation, family of functions, parent function, translation, reflection, horizontal & vertical shrink/stretch
GRAPHING LINEAR FUNCTIONS	3.7	HSA-CED.A.2 HSA-REI.D.10 HSF-IF.C.7b HSF-BF.B.3	...graph absolute value functions. ...determine the vertex of an absolute value function. ...describe the transformation from the parent graph to a family function.	Graph $g(x)= x +1$. Describe the transformations from the graph of $f(x)= x $ to the graph of $g(x)=2 x+4 $.	absolute value function, vertex

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WRITING LINEAR FUNCTIONS	4.1	HSA-CED.A.2 HSF-BF.A.1a HSF-LE.A.1b HSF-LE.A.2	... write a linear equations in slope intercept form from given information.	Write an equation in slope-intercept form for: (1) a line passing through (-3,6) and (-2,-8) (2) $g(0)=9$ & $g(8)=7$	Slope-intercept form
WRITING LINEAR FUNCTIONS	4.2	HSA-CED.A.2 HSF-BF.A.1a HSF-LE.A.1b HSF-LE.A.2	... write a linear equations in point-slope form from given information.	Write an equation in point-slope form for: (1) a line passing through (-3,6) and (-2,-8) (2) $g(0)=9$ & $g(8)=7$	Point-slope form
WRITING LINEAR FUNCTIONS	4.3	HSA-CED.A.2 HSF-LE.A.2	...identify if lines are parallel and perpendicular from given equations. ...write equations for parallel and perpendicular lines.	(1) Identify which lines are parallel or perpendicular. (Line a) $2x+6y=3$, (Line b) $y=3x-8$, & (Line c) $-6y+18x=9$. (2) Write an equation for a line parallel to $y=2x-3$ passing through (-4, 2).	Parallel and perpendicular lines

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WRITING LINEAR FUNCTIONS	4.4	HSF-LE.B.5 HSS-ID.B.6a HSS-ID.B.6c HSS-ID.C.7	<p>... compute(using technology) and interpret the line of regression.</p> <p>... understand positive, negative and no correlation.</p> <p>... recognize trends in data</p> <p>... represent data on a scatterplot.</p> <p>... fit a linear function for a scatter plot that suggest a linear association</p>	<p>1. The table shows the price of a stock over an 8 month period. Graph a scatter plot of the given data. Draw the trend line. Then predict what the price of one share of stock will be in the twelfth month.</p> <table border="1" data-bbox="1417 472 1577 493"> <tr> <td>Month</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>Price (\$)</td> <td>12</td> <td>10</td> <td>7</td> <td>6</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> </tr> </table> <p>Write positive, negative, or none to describe the correlation illustrated by each scatter plot.</p> <p>2. </p> <p>3. </p> <p>The average number of gallons of coffee per person consumed in the United States is shown in the table below.</p> <table border="1" data-bbox="1417 641 1606 690"> <tr> <td>Years</td> <td>1996</td> <td>1998</td> <td>2000</td> <td>2001</td> <td>2002</td> <td>2003</td> </tr> <tr> <td>Avg. annual per capita consumption</td> <td>23.9</td> <td>25.1</td> <td>26.3</td> <td>24.2</td> <td>23.6</td> <td>24.3</td> </tr> </table> <p>4. Graph a scatter plot of the data.</p> <p>5. Draw a trend line.</p> <p>6. Describe the correlation.</p> <p>7. Based on the trend line you draw, predict the average amount of coffee consumed per person in 2007.</p> <p>8. How confident are you in your prediction? Explain.</p> <p></p>	Month	1	2	3	4	5	6	7	8	Price (\$)	12	10	7	6	4	3	2	1	Years	1996	1998	2000	2001	2002	2003	Avg. annual per capita consumption	23.9	25.1	26.3	24.2	23.6	24.3	scatter plot, correlation, line of best fit
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WRITING LINEAR FUNCTIONS	4.5	HSF-LE.B.5 HSS-ID.B.6a HSS-ID.B.6b HSS-ID.B.6c HSS-ID.C.7 HSS-ID.C.8 HSS-ID.C.9	<p>...use residuals to determine how well lines of fit model data.</p> <p>...use technology to find lines of best fit.</p> <p>...distinguish between correlation & causation.</p>	<p>(1) Use residuals to determine whether the model is a good fit, (2) Find an equation of the line of best fit, (3) identify and interpret the correlation coefficient, of the data.</p> <table border="1" data-bbox="1417 1096 1669 1144"> <tr> <td>x</td> <td>-4</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>-18</td> <td>-13</td> <td>-10</td> <td>-7</td> <td>-2</td> <td>0</td> <td>6</td> <td>10</td> <td>15</td> </tr> </table>	x	-4	-3	-2	-1	0	1	2	3	4	y	-18	-13	-10	-7	-2	0	6	10	15	residual, linear regression, correlation coefficient, interpolation, extrapolation, causation.												
x	-4	-3	-2	-1	0	1	2	3	4																												
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WRITING LINEAR FUNCTIONS	4.6	HSF-IF.A.3 HSF-BF.A.1a HSF-BF.A.2 HSF-LE.A.2	...write the terms of arithmetic sequences. ...graph arithmetic sequences. ...write arithmetic sequences as functions.	(1) Write the next three terms & graph: -12, 0, 12, 24. (2) Write an equation for the nth term; 4,5,6,7...	sequence including arithmetic, terms, common difference.
WRITING LINEAR FUNCTIONS	4.7	HSA-CED.A.2 HSA-REI.D.10 HSF-IF.C.7b	...evaluate piecewise functions. ...graph and write piecewise functions. ...graph and write step functions. ...write absolute value functions.	Graph the function & describe the domain & range. $y = \begin{cases} 2x + 1, & \text{if } x \leq -1 \\ -x + 2, & \text{if } -1 < x < 2 \\ -3, & \text{if } x \geq 2 \end{cases}$	piecewise function, step function

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SOLVING SYSTEMS OF LINEAR EQUATIONS	5.1	HSA-CED.A.3 HSA-REI.C.6	...check solutions of systems of linear equations. ...solve systems of linear equations by graphing. ...use systems of linear equations to solve real-life problems.	Solve the system by graphing. $x-4y=-4$ $-3x-4y=12$	systems of linear equations, solutions
SOLVING SYSTEMS OF LINEAR EQUATIONS	5.2	HSA-CED.A.3 HSA-REI.C.6	...solve systems of linear equations by substitution. ...use systems of linear equations to solve real-life problems.	Solve the system by substitution. $y=-2x-9$ $6x-5y=-19$	systems of linear equations, solutions
SOLVING SYSTEMS OF LINEAR EQUATIONS	5.3	HSA-CED.A.3 HSA-REI.C.5 HSA-REI.C.6	...solve systems of linear equations by elimination. ...use systems of linear equations to solve real-life problems.	Solve the system by elimination. $3x+2y=4$ $3x-2y=-4$	coefficient
SOLVING SYSTEMS OF LINEAR EQUATIONS	5.4	HSA-CED.A.3 HSA-REI.C.6	...determine the numbers of solutions of linear systems. ...use linear systems to solve real-life problems.	Solve the system. $-2x+y=3$ $-4x+2y=6$ The perimeter of the trapezoidal piece of land is 48 km. The perimeter of the rectangular piece of land is 144 km. Write & solve a system of linear equations.	parallel

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SOLVING SYSTEMS OF LINEAR EQUATIONS	5.5	HSA-CED.A.3 HSA-REI.D.11	<p>... solve linear equations by graphing.</p> <p>... solve absolute value equations by graphing.</p> <p>... use linear equations to solve real-life problems.</p>	<p>Solve the equation by graphing.</p> <p>(1) $-4+9x=-3x+2$</p> <p>(2) $2x + 2 = x - 2$</p>	linear equations, graphs, absolute value
SOLVING SYSTEMS OF LINEAR EQUATIONS	5.6	HSA-CED.A.3 HSA-REI.D.12	<p>...check solutions of linear inequalities.</p> <p>...graph linear inequalities in two variables.</p> <p>...use linear inequalities to solve real-life problems.</p>	<p>(1) Tell whether the ordered pair is a solution of the inequality.</p> <p>$x+y>0$; $(-2,2)$</p> <p>(2) Graph the inequality $x-2y<0$</p>	linear inequality, solution & graph of a linear inequality
SOLVING SYSTEMS OF LINEAR EQUATIONS	5.7	HSA-CED.A.3 HSA-REI.D.12	<p>...check solutions of systems of linear inequalities.</p> <p>...graph systems of linear inequalities.</p> <p>...write systems of linear inequalities.</p> <p>...use systems of linear inequalities to solve real-life problems.</p>	<p>Graph the system</p> <p>$y \geq -x+4$</p> <p>$x+y < 0$</p>	Solving systems of linear inequalities

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EXPONENTIAL FUNCTIONS AND SEQUENCES	6.1	HSN-RN.A.2	... use zero and negative exponents ... use the properties of exponents ... solve real-life problems using exponents	Simplify $\frac{a^6 b^3}{(ab^3)^4}$	Power, exponent, base, scientific notation
EXPONENTIAL FUNCTIONS AND SEQUENCES	6.2	HSN-RN.A.1 HSN-RN.A.2	... find nth roots ... evaluate expressions with rational exponents ... solve real-life problems involving rational exponents	Evaluate $\sqrt[5]{-243}$	nth root of a, radical, index of a radical

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EXPONENTIAL FUNCTIONS AND SEQUENCES	6.3	HSA-CED.A.2 HSF-IF.B.4 HSF-IF.C.7e HSF-IF.C.9 HSF-BF.A.1a HSF-BF.B.3 HSF-LE.A.1a HSF-LE.A.2	...identify and evaluate exponential functions ... graph exponential functions ... solve real-life problems involving exponential functions	Graph $f(x) = 3^{x+2}$	Exponential function
EXPONENTIAL FUNCTIONS AND SEQUENCES	6.4	HSA-SSE.B.3c HSA-CED.A.2 HSF-IF.C.7e HSF-IF.C.8b HSF-BF.A.1a HSF-LE.A.1c HSF-LE.A.2	... use and identify exponential growth and decay functions ... interpret and rewrite exponential growth and decay function ... solve real-life problems involving exponential growth and decay	The attendance at the county fair is 34,500. The attendance y increases by 4.2% each year. Write an exponential function that represents the attendance after t years.	Exponential growth, exponential function, exponential decay, exponential decay function, compound interest

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EXPONENTIAL FUNCTIONS AND SEQUENCES	6.5	HSA-CED.A.1 HSA-REI.A.1 HSA-REI.D.11	<ul style="list-style-type: none"> ... solve exponential equations with the same base ... solve exponential equations with unlike bases ... solve exponential equations by graphing 	Solve $5^x = 5^{3x-2}$	Exponential equation
EXPONENTIAL FUNCTIONS AND SEQUENCES	6.6	HSF-IF.A.3 HSF-BF.A.2 HSF-LE.A.2	<ul style="list-style-type: none"> ... identify geometric sequences ... extend and graph geometric sequences ... write geometric sequences as functions 	Decide whether the sequence is arithmetic, geometric, or neither. Write the next two terms. 3, 12, 48, 192, ...	Geometric sequence, common ratio
EXPONENTIAL FUNCTIONS AND SEQUENCES	6.7	HSF-IF.A.3 HSF-BF.A.1a HSF-BF.A.2 HSF-LE.A.2	<ul style="list-style-type: none"> ... write terms of recursively defined sequences ... write recursive rules for sequences ... translate between recursive rules and explicit rules ... write recursive rules for special sequences 	Write a recursive rule for the following sequence 625, 125, 25, 5, ...	Explicit rule, recursive rule