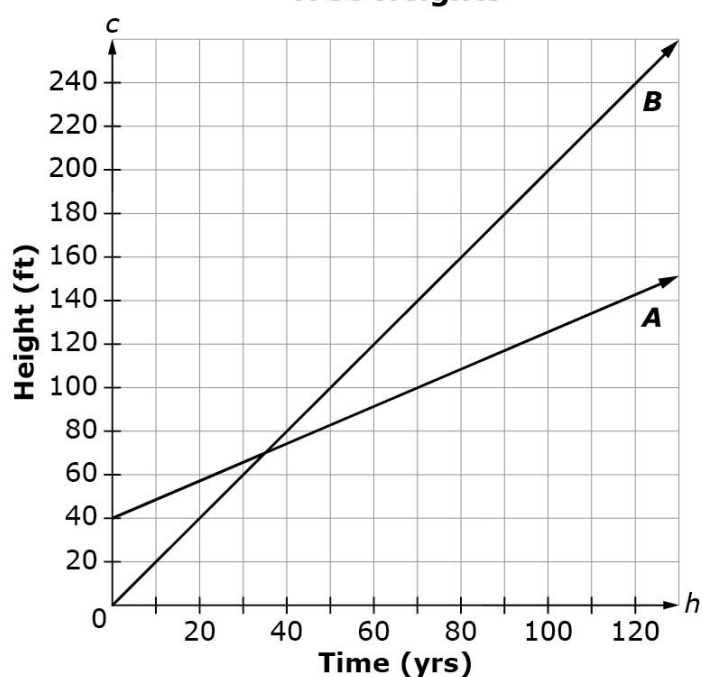
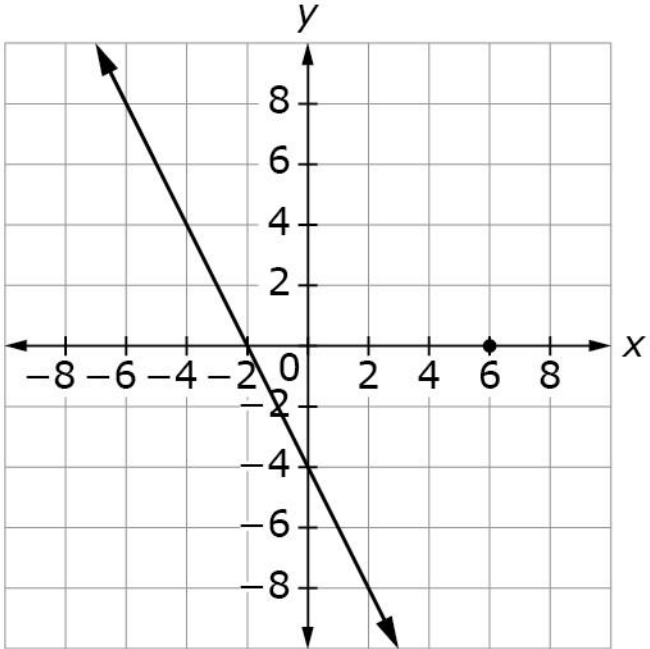


<p><b>Task Model 3</b></p> <p><b>Response Type:</b> Equation/Numeric</p> <p><b>DOK Level 1</b></p> <p><b>8.EE.8b</b> Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i></p> <p><b>Evidence Required:</b> 3. The student estimates solutions by graphing systems of two linear equations in two variables.</p> <p><b>Tools:</b> Calculator</p>	<p><b>Prompt Features:</b> The student identifies solutions to a system of two linear equations in two variables by locating points of intersection of their graphs.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>Context should be familiar to 13–15 year olds.</li> <li>Student interprets graph for either the <math>x</math> value, or the <math>y</math> value, within the given context.</li> <li>Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>Point of intersection on graph is on intersecting grid lines.</li> <li>Point of intersection on graph is not intersecting grid lines.</li> </ul> </li> </ul> <p><b>TM3a</b></p> <p><b>Stimulus:</b> The student is presented with a graph of two linear equations having one solution.</p> <p><b>Example Stem:</b> The graph shown compares the height of Tree A and the height Tree B over time (in years).</p> <div style="text-align: center;"> <p><b>Tree Heights</b></p>  </div> <p>How many years after Tree B was planted did Tree A and Tree B have the same height?</p> <p><b>Rubric:</b> (1 point) Student correctly gives the appropriate value from the coordinate point (e.g., 35 years).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 3</b></p> <p><b>Response Type:</b> <b>Graphing</b></p> <p><b>DOK Level 2</b></p> <p><b>8.EE.8b</b> Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i></p> <p><b>Evidence Required:</b> 3. The student estimates solutions by graphing systems of two linear equations in two variables.</p> <p><b>Tools:</b> Calculator</p>	<p><b>Prompt Features:</b> The student is prompted to graph one of the equations in a system of two linear equations in two variables with one solution.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• The student uses the Add Arrow tool to draw the line on a coordinate grid with labeled <math>x</math>- and <math>y</math>-axes and a scale.</li> <li>• The student uses the Add Point tool to plot the solution to the system of equations.</li> <li>• <math>y</math>-intercept of the equation the student will graph should be integers</li> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ Equation graphed by the student is in slope-intercept form; coefficient, constant, and slope are positive integers</li> <li>○ Equation graphed by the student is in slope-intercept form with rational number coefficients; slope is an integer</li> <li>○ Equation graphed by the student is in standard form; slope is a rational number</li> <li>○ Equation graphed by the student is in standard form with rational coefficients; slope is a positive or negative fraction</li> </ul> </li> </ul> <p><b>TM3b</b> <b>Stimulus:</b> The student is presented with a system of two linear equations. One of the equations is graphed.</p> <p><b>Example Stem:</b> The graph of <math>2x - y = 4</math> is shown.</p> <p>Use the Add Arrow tool to graph the equation <math>y = 3x - 2</math> on the same coordinate plane. Use the Add Point tool to plot the solution to this system of linear equations.</p> <div style="text-align: center;">  </div>
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## Grade 8 Mathematics Item Specification C1 TD

	<p><b>Interaction:</b> The student uses the [double] Add Arrow tool to graph a line on a grid. The student uses the Add Point tool to place a point on the graph.</p> <p><b>Rubric:</b> (1 point) The student plots the line correctly and places a point on the point of intersection.</p> <p><b>Response Type:</b> Graphing</p>
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<p><b>Task Model 4</b></p> <p><b>Response Type:</b> Multiple Choice, single correct response</p> <p><b>DOK Level 2</b></p> <p><b>8.EE.8b</b> Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</p> <p><b>Evidence Required:</b> 4. The student recognizes when a system of two linear equations in two variables has one solution, no solution, or infinitely many solutions.</p> <p><b>Tools:</b> Calculator</p>	<p><b>Prompt Features:</b> The student is prompted to identify if a system of linear equations has one solution, no solution, or infinitely many solutions.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• System of two linear equations in two variables with integer coefficients</li> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ Equations are written in the same form</li> <li>○ Equations are written in different forms</li> <li>○ The x- and y- coefficients are the same in both equations</li> <li>○ The coefficients in one equation are not multiples of the coefficients of the other equation</li> <li>○ The x- and y- coefficients in one equation are whole number or fractional multiples of the coefficients in the other equation</li> <li>○ The constant is the same in both equations</li> <li>○ The constant is different in each equation</li> </ul> </li> </ul> <p><b>TM4</b> <b>Stimulus:</b> The student is presented with two linear equations in two variables.</p> <p><b>Example Stem 1:</b> A system of two linear equations has no solution. One equation is <math>3x + y = -2</math>. Select the equation that would make this system have no solution.</p> <p>A. <math>2x + y = 4</math> B. <math>2x + y = 5</math> C. <math>3x + y = 4</math> D. <math>4x + y = 5</math></p> <p><b>Answer Choices:</b> The correct answer is the linear equation in two variables that satisfies the given condition for the number of solutions. The distractors will be equations that yield other solution sets that do not satisfy the given condition.</p> <p><b>Rubric:</b> (1 point) Correct answer is the linear equation in two variables that satisfies the given condition for the number of solutions (e.g., C).</p> <p><b>Response Type:</b> Multiple Choice, single correct response</p> <p><b>Example Stem 2:</b> Select the statement that correctly describes the solution to this system of equations.</p> <p><math>3x + y = -2</math> <math>x - 2y = 4</math></p> <p>A. There is no solution. B. There are infinitely many solutions. C. There is exactly one solution at <math>(-2, -4)</math>. D. There is exactly one solution at <math>(0, -2)</math>.</p>
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	<p><b>Answer Choices:</b> The correct answer is the statement that describes the solution to the system of equations such as “There are infinitely many solutions,” “There is no solution” or “There is exactly one solution at <math>(a, b)</math>.” The distractors will be statements that incorrectly describe the solution to the system of equation including “There is exactly one solution at <math>(a, b)</math>,” where <math>(a, b)</math> is not a correct solution to the system of equations.</p> <p><b>Rubric:</b> (1 point) Correct answer is the statement that describes the solution to the system of equations (e.g., D).</p> <p><b>Response Type:</b> Multiple Choice, single correct response</p>
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<p><b>Task Model 5</b></p> <p><b>Response Type:</b> <b>Equation/Numeric</b></p> <p><b>DOK Level 2</b></p> <p><b>8.EE.8b</b> Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</i></p> <p><b>Evidence Required:</b> 5. The student solves a system of two linear equations in two variables algebraically, or solves real-world and mathematical problems leading to two linear equations in two variables.</p> <p><b>Tools:</b> Calculator</p>	<p><b>Prompt Features:</b> The student is prompted to solve two linear equations in two variables.</p> <p><b>Stimulus Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Sets of linear equations in two variables with one solution</li> <li>• Item difficulty can be adjusted via these example methods:             <ul style="list-style-type: none"> <li>○ The equations are written with integer coefficients:                 <ul style="list-style-type: none"> <li>▪ Both equations are in slope-intercept form, <math>y = mx + b</math>, and <math>b = 0</math> for at least one equation.</li> </ul> </li> <li>○ The equations are written with integer coefficients:                 <ul style="list-style-type: none"> <li>▪ Both equations are in slope-intercept form, <math>y = mx + b</math>, and <math>b \neq 0</math>.</li> </ul> </li> <li>○ Both equations are in standard form with integer coefficients.</li> <li>○ Equations are in different forms with fraction or decimal coefficients.</li> </ul> </li> </ul> <p><b>TM5a</b> <b>Stimulus:</b> Two linear equations in two variables with exactly one solution, where the student enters either the x-coordinate or the y-coordinate.</p> <p><b>Example Stem:</b> Enter the y coordinate of the solution to this system of equations.</p> $3x + y = -2$ $x - 2y = 4$ <p><b>Rubric:</b> (1 point) Student enters the correct numerical solution (e.g., -2).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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<p><b>Task Model 5</b></p> <p><b>Response Type:</b> <b>Equation/Numeric</b></p> <p><b>DOK Level 2</b></p> <p><b>8.EE.8c</b> Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through and second pair.</i></p> <p><b>Evidence Required:</b> 5. The student solves a system of two linear equations in two variables algebraically, or solves real-world and mathematical problems leading to two linear equations in two variables.</p> <p><b>Tools:</b> Calculator</p>	<p><b>Prompt Features:</b> The student is prompted to solve a real-world problem with two linear equations with two variables.</p> <p><b>Stimulus Guidelines:</b> Item difficulty can be adjusted via these example methods:</p> <ul style="list-style-type: none"> <li>• Using integer values</li> <li>• Rational numbers including fractions and decimals to the tenths place.</li> </ul> <p><b>TM5b</b> <b>Stimulus:</b> The student is presented with a real-world content that can be represented by two linear equations with two variables.</p> <p><b>Example Stem 1:</b> A tree that is 8 feet tall is growing at a rate of 1 foot each year. A tree that is 10 feet tall is growing at a rate of <math>\frac{1}{2}</math> foot each year.</p> <p>Enter the number of years it will take the two trees to reach the same height.</p> <p><b>Rubric:</b> (1 point) Student enters the correct numerical solution (e.g., 4).</p> <p><b>Response Type:</b> Equation/Numeric</p>
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