RAISE For Success + Equity
Rice Algebra Initiative

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Unit 2 Student Diagnostic

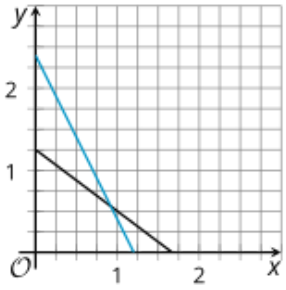
These materials, when encountered before the denoted lesson, support access to the lesson and identify potential areas where additional support may be required. Note that the content in these lesson diagnostics represents prerequisite skills and does not address the required rigor for full mastery of the on-grade level standards.

Your students may benefit from using these materials in conjunction with the Unit Overview and Readiness page (quiz and mini-lessons).

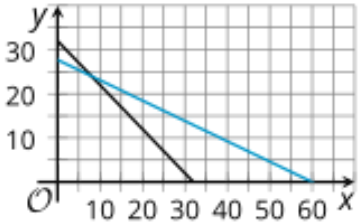
Lesson 2.1: Writing and Graphing Systems of Equations Check-in

1. Draw a line that matches each pair of graphs to a situation.

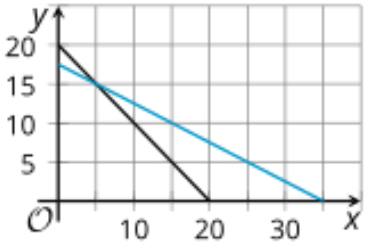
Graph A



Graph B



Graph C



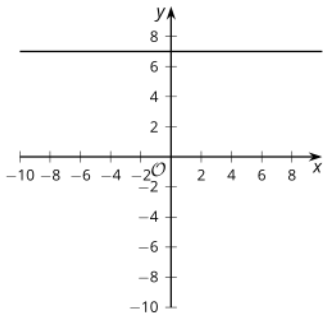
A restaurant has a total of 20 tables - round tables that seat 2 people and rectangular tables that seat 4 people. All 70 seats in the restaurant are occupied.	A family buys a total of 32 tickets at a carnival. Ride tickets cost $1.50 each and food tickets cost $3.25 each. The family pays a total of $90 for the tickets.	Tyler and Andre are shopping for snacks in bulk at the grocery store. Tyler pays $10 for 6 ounces of almonds and 8 ounces of raisins. Andre pays $12 for 10 ounces of almonds and 5 ounces of raisins.

2. At what point do the graphs intersect?
    a. Graph A
    b. Graph B
    c. Graph C

Lesson 2.2: Writing Systems of Equations Check-in

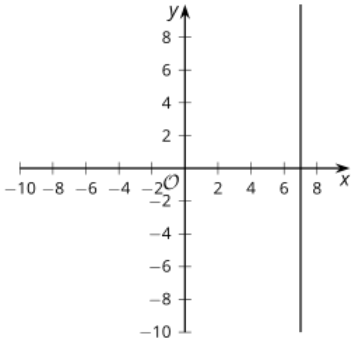
Draw lines to match each table of values to a graph. Then, draw a line from each graph to the equation it represents.

x	-2	-1	0	1
y	7	7	7	7



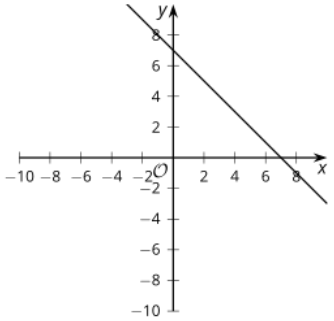
$x + y = 7$

x	7	7	7	7
y	-2	-1	0	1



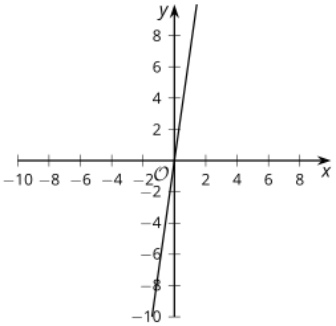
$y = 7$

x	-2	-1	0	1
y	-8	-4	0	4



$x = 7$

x	-2	-1	0	1
y	9	8	7	6



$y = 4x$

Lesson 2.3: Solving Systems by Substitution Check-in

Find the value of y when $x = 5$.

1. $y = 3x - 4$

2. $y = \frac{2}{5}x + 4$

3. $y = 2x + 3 + (3x - 1)$

4. $y = 4x - (x + 1)$

Lesson 2.4: Solving Systems by Elimination, Part 1 Check-in

Rewrite each expression by combining like terms.

1. $11x - 2x$

2. $5t + 3z - 2t$

3. $-4x + 6r - (7x + 2r)$

4. $8x - 3y + (3y - 5x)$

5. $9x - 2y - 3(3x + y)$

Lesson 2.5: Solving Systems by Elimination, Part 2 Check-in

For each row in the table, the equations are equivalent. Explain how the equations are related to each other.

Equation A	Equation B	Relationship
$3x - 1 = 5$	$6x - 2 = 10$	
$4(x + 1) = 3x - 12$	$4x + 4 = 3(x - 4)$	
$14x + 10 = 4x + 6$	$7x + 5 = 2x + 3$	
$2x + 6y = 10$	$5x + 15y = 25$	
$4x + 5y = 2 - 4x + 5y$	$4x + 9y = 2 + 9y - 4x$	

Lesson 2.6: Solving Systems by Elimination, Part 3 Check-in

For each question, determine what number is needed to multiply the equation by to get the targeted coefficient. Then, determine the new equation after the original has been multiplied by that value.

1. Multiply the equation $3x + 4y = 8$ so that the coefficient of x is 9.

   Multiply by ...

   The new equation is ...

2. Multiply the equation $8x + 4y = -16$ so that the coefficient of y is 1.

   Multiply by ...

   The new equation is ...

3. Multiply the equation $10x - 4y = 17$ so that the coefficient of y is -8.

   Multiply by ...

   The new equation is ...

Lesson 2.7: Systems of Linear Equations and Their Solutions Check-in

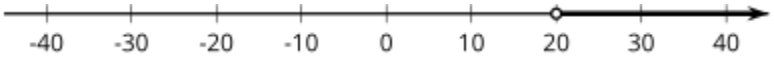
Determine if the equation has one solution that makes it true, an infinite number, or no real solutions. Check the box that represents your answer.

Equation	One Solution	Infinitely Many Solutions	No Solutions
$3x + 1 = 10$	☐	☐	☐
$2x + 12 = 2x + 10 + 2$	☐	☐	☐
$2x = x + 2$	☐	☐	☐
$3(x + 4) = 3x + 4$	☐	☐	☐
$\frac{2x+6}{2} = x + 6$	☐	☐	☐
$x + 3x - 4 = 7(x - \frac{4}{7})$	☐	☐	☐

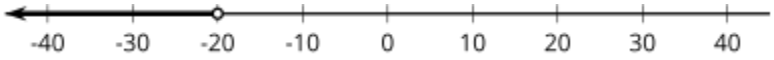
Lesson 2.8: Representing Situations with Inequalities Check-in

1. Place an inequality symbol to correctly complete the comparison.
   a. 5 _____ 10
   b. 5 _____ -10
   c. -5 _____ -10
   d. $\frac{1}{5}$ _____ $\frac{1}{10}$
2. Write an inequality for each of the graphs.

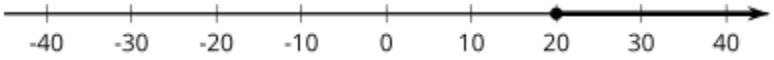
a.



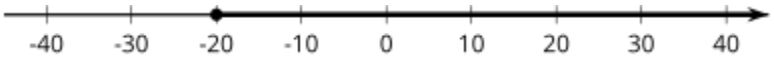
b.



c.



d.



Lesson 2.9: Solutions to Inequalities Check-in

For each expression, pick a number you would like to evaluate, and tell whether it makes the inequality true. Be prepared to explain what made you choose your number.

1. $\frac{4}{3}y + 10 > 19$

    a. Pick a number you would like to test in place of y: -1, 0, 1, 3, 4, or 5. Explain why you chose your number.

    b. Does your number make the inequality true?

    c. What is a different number that is definitely a solution? How do you know?

    d. What is a different number that is definitely not a solution? How do you know?

2. $10 - 3y < 5$

    a. Pick a number you would like to test in place of y: -100, -3, -1, 0, $\frac{1}{3}$, $\frac{5}{3}$, 33, or 100. Explain why you chose your number.

    b. Does your number make the inequality true?

    c. What is a different number that is definitely a solution? How do you know?

    d. What is a different number that is definitely not a solution? How do you know?

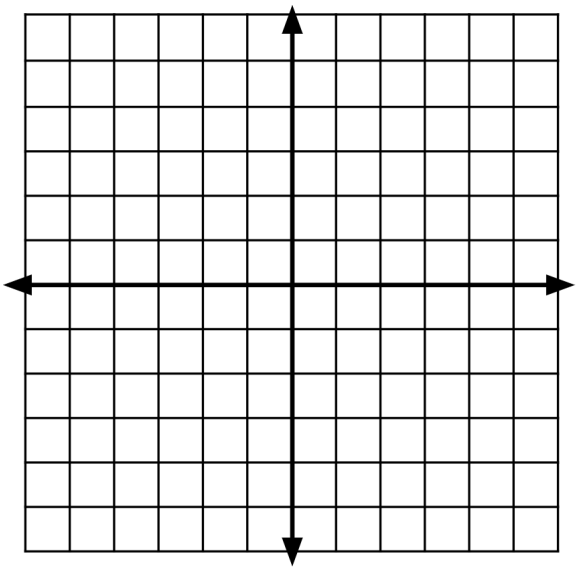
Lesson 2.10: Writing and Solving Inequalities in One Variable Check-in

Solve each inequality. Then, check your answer using a value that makes your solution true.

1. $-2x < 4$
    a. Solve the inequality.
    b. Check your answer using a value that makes your solution true.
2. $3x + 5 > 6x - 4$
    a. Solve the inequality.
    b. Check your answer using a value that makes your solution true.
3. $-3(x + 1) \geq 13$
    a. Solve the inequality.
    b. Check your answer using a value that makes your solution true.

Lesson 2.11: Graphing Linear Inequalities in Two Variables Check-in

1. Graph the line that represents $y = 3x - 4$.



2. Is the point (4, 8) on the line?

3. Determine and draw 3 points on the graph according to the following information.

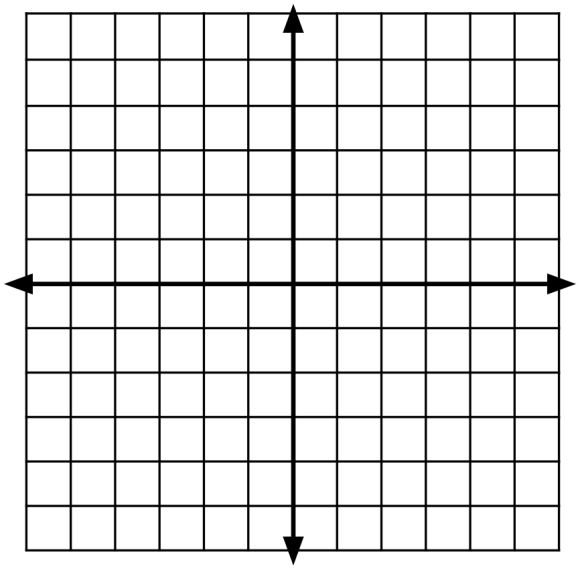
    a. Determine a value for a so that $(2, a)$ is on the line.

    b. Determine a value for b so that $(1, b)$ so it is above the line.

    c. Determine a value for c so that $(c, -1)$ so it is below the line.

Lesson 2.12: Using Linear Inequalities as Constraints Check-in

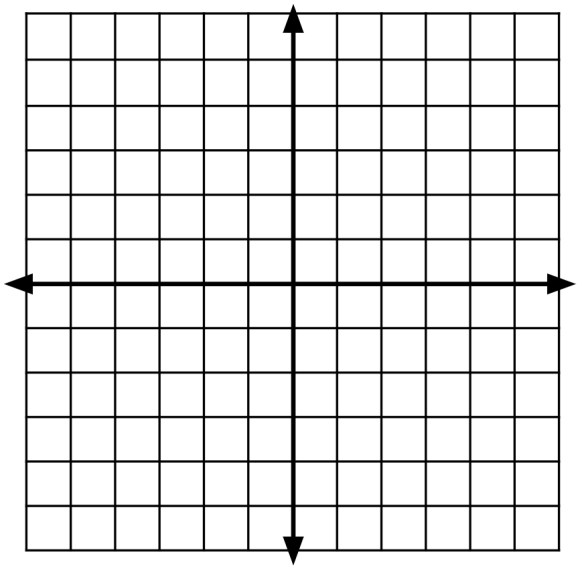
1. Graph the boundary line for the inequality $2y \geq 4x - 8$.



   a. What is the x-intercept for the graph of its boundary line?

   b. What is the y-intercept for the graph of its boundary line?

2. Graph the boundary line for the inequality $2x + 3y < 12$.



   a. What is the x-intercept for the graph of its boundary line?

   b. What is the y-intercept for the graph of its boundary line?

Lesson 2.13: Solving Problems with Inequalities in Two Variables Check-in

For questions 1 - 4, use the following scenario.

> Jada received $100 on her birthday. She has a savings account and a checking account that she can deposit the money in.

1. Which of the following could represent Jada's deposits into each account? **Select three** choices for the deposits.

   - ☐ $50 in each account
   - ☐ $100 in each account
   - ☐ $20 in one account and $60 in the other account
   - ☐ $60 in each account
   - ☐ $40 in one account and $60 in the other account
   - ☐ $40 in one account and $75 in the other account

2. What did you check to be sure the totals worked for the constraint in the scenario?

3. What are the quantities in the scenario that are being tested?

4. Which algebraic statement could best represent the scenario?

   A. $x + y < 100$

   B. $x + y \leq 100$

   C. $x + y > 100$

   D. $x + y \geq 100$

   E. $x + y = 100$

Lesson 2.14: Solutions to Systems of Linear Inequalities in Two Variables Check-in

For questions 1 - 5, examine the following riddle.

> Joey was thinking of two numbers. Their sum is 15. Their difference is 1.

1. Find a pair of numbers that satisfy the first condition (sum to 15).

2. Find a pair of numbers that satisfy the second condition (difference of 1).

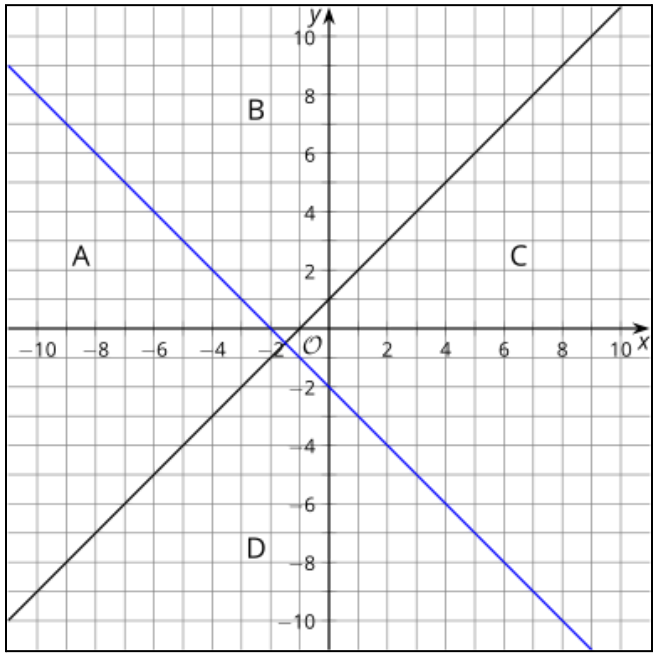
3. Find a pair of numbers that satisfy both conditions.

4. Can you find more than one pair of numbers that satisfy both conditions? If so, state as many as you can find. If not, explain why not.

5. Write a system of equations or inequalities that represent the riddle.

Lesson 2.15: Solving Problems with Systems of Linear Inequalities in Two Variables Check-in

The graph shows the lines $y = x + 1$ and $y = -x - 2$.



1. For each of the 4 regions, write a coordinate pair for a point in that region.

   Region A

   Region B

   Region C

   Region D

2. Change the equations represented by the lines into inequalities so that the region labeled as A is shaded by both inequalities.

   y _____ $x + 1$

   y _____ $-x - 2$

3. Use the coordinate pair you chose for region A to verify your inequalities algebraically.