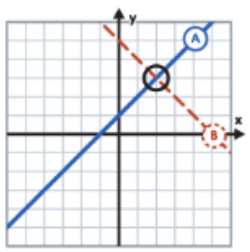
SOLVING SYSTEMS OF EQUATIONS BY GRAPHING

GRADES 8-9

ANSWER KEY



solution (2, 3)

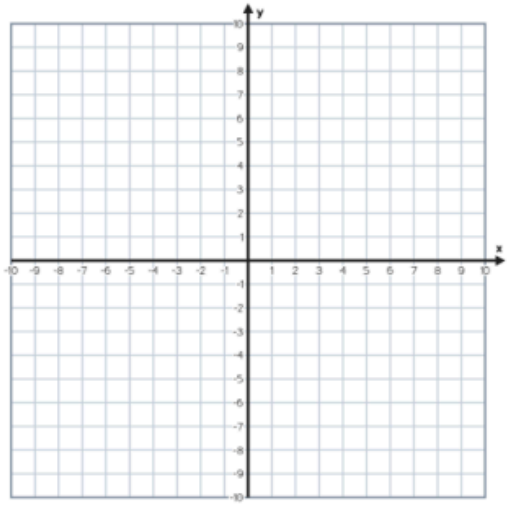
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Graph 5: The Big Grid

Graph both lines on the big grid.

Graph line A and line B. The slope of B is a fraction use the bottom number for the run.

(A) $y = 2x - 3$ (B) $y = -\frac{1}{2}x + 7$



The lines cross at (☐ , ☐) ☐ A works ☐ B works

Check both equations.

Systems of Equations - Graph 5: The Big Grid

44 PAGES

Bright Path Sped

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- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the tracker, class grid, team note and family page. You can also print any page and write by hand.
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Print at 100 percent

Turn off fit to page and shrink to fit so the grids and the ruled lines keep their size. On the pages with a printed graph, line A is solid and line B is dashed, so the two still tell apart when copied in black and white.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

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PREVIEW

How To Read a Page

The parts of a student page, then the kinds of sheet in the order they come.

The parts of a page

- **The blank grid.** A coordinate grid to graph on. Print the page and draw with a pencil and a ruler. Line A is solid and line B is dashed.
- **The answer box.** A bordered box for a number, a letter or a point. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for steps and sentences. Write one step to a line.
- **The check box.** True or false, works or does not: click or mark.
- **The cut line.** Nine pieces in a short grid, edge to edge: two straight cuts across and two down.

Kind of sheet	How many	What the student does
References and words	3 sheets	How to graph a line, the four steps and three cases, six words to match.
Worked examples	2 sheets	One in y = mx + b and one in standard form, every step shown, with the graph.
Slope and y-intercept	1 sheet, 8 items	Read the slope and the y-intercept from an equation.
Graphing	6 sheets, 11 systems	Guided, less help, standard form, on your own, the big grid, special cases.
Read and check	4 sheets, 16 items	Read the crossing point off a drawn graph; test a point in both equations.
How many solutions	2 sheets, 12 items	Look at drawn lines, then at equations alone.
Word problems	2 sheets, 4 problems	Write the equations, graph them, say when the two are equal.
Checks and mistakes	2 sheets, 12 items	True or false, and Devon's four mistakes to find.
Writing, quizzes, sorts	3 prompts, 12 items, 18 pieces	Explain-its with five ruled lines each, two quizzes, exit tickets, two sorts.

Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 33 to 37, and every key line shows the check, not only the answer.

Explain-its

Their keys (page 37) say what to look for, not one right sentence. Accept any answer that uses slope, a crossing point or a check in both equations correctly.

Printing and the type-in fields

The graphs are drawn on paper, so print the graph pages. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

Room to work

Every system has its own grid, 3.6 inches across, and the big grid is 5.6 inches. If a student needs more room, hand over one page a day, or let students sketch on scrap paper and copy the line onto the grid.

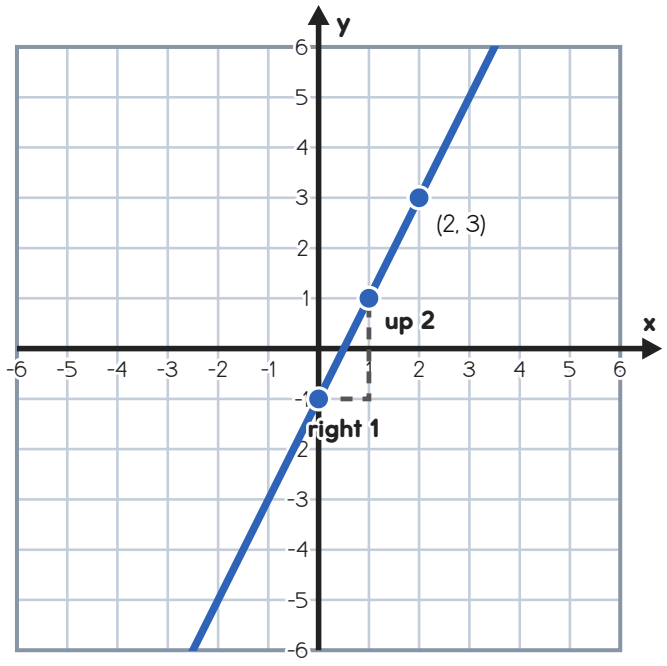
PREVIEW

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How to Graph a Line

Read how to graph a line. Keep this page out.



Step 1 Look at y = 2x - 1. The number alone, -1, is the y-intercept. Mark (0, -1) on the y-axis.

Step 2 The number with x, 2, is the slope. Write it as 2/1: up 2, right 1.

Step 3 From (0, -1) go right 1 and up 2. Mark (1, 1). Do it again for (2, 3).

Step 4 Use a ruler. Draw a line through the points. Add arrows on both ends.

Slope is rise over run

Slope = rise / run. A slope of 2 is $\frac{2}{1}$: **up 2, right 1**. A slope of $\frac{1}{2}$ is **up 1, right 2**. A negative slope goes **down**: -3 is down 3, right 1. The y-intercept is where the line crosses the y-axis, at (0, b).

In your own words: what does the slope tell you?

PREVIEW

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Systems Words

Match each word to what it means.

Write the letter of the meaning in the box. Use the four steps page to help you.

1	**system of equations**		**A**	How steep a line is: rise over run.
2	**solution**		**B**	The point where two lines cross.
3	**intersection**		**C**	Where a line crosses the y-axis, at the point (0, b).
4	**parallel**		**D**	Two or more equations that use the same variables.
5	**slope**		**E**	Lines that never cross; they have the same slope.
6	**y-intercept**		**F**	An ordered pair (x, y) that makes both equations true.

Use two of the words in one sentence about a system.

PREVIEW

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My name _____ Date _____

Slope and y-Intercept

Write the slope and the y-intercept of each line.

The slope is the number with x. The y-intercept is the number by itself. If you see only x, the y-intercept is 0.

1. $y = 3x + 2$ slope ☐ y-intercept ☐
2. $y = -x + 5$ slope ☐ y-intercept ☐
3. $y = \frac{1}{2}x - 3$ slope ☐ y-intercept ☐
4. $y = -2x - 1$ slope ☐ y-intercept ☐
5. $y = x - 4$ slope ☐ y-intercept ☐
6. $y = -\frac{3}{2}x + 2$ slope ☐ y-intercept ☐
7. $y = 4x$ slope ☐ y-intercept ☐
8. $y = \frac{2}{3}x + 1$ slope ☐ y-intercept ☐

Pick one line. Tell how you would graph it from its slope and y-intercept.

PREVIEW

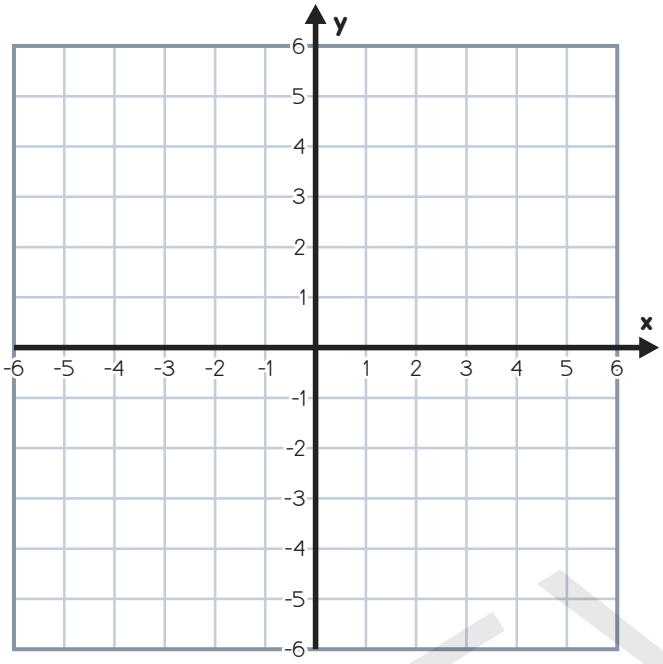
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Graph 2: Less Help

Graph both lines. Find where they cross.

Mark the y-intercept first. Then use the slope. Use a ruler.



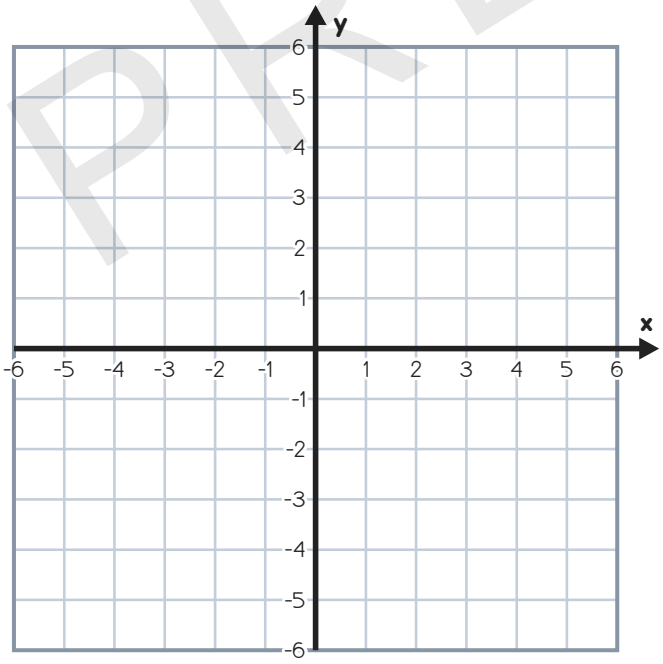
1 **A** $y = 3x - 2$

B $y = -x + 2$

The lines cross at (☐ , ☐)

Check: put x and y in each equation.

☐ **A works** ☐ **B works**



2 **A** $y = \frac{1}{2}x + 1$

B $y = -x - 2$

The lines cross at (☐ , ☐)

Check: put x and y in each equation.

☐ **A works** ☐ **B works**

PREVIEW

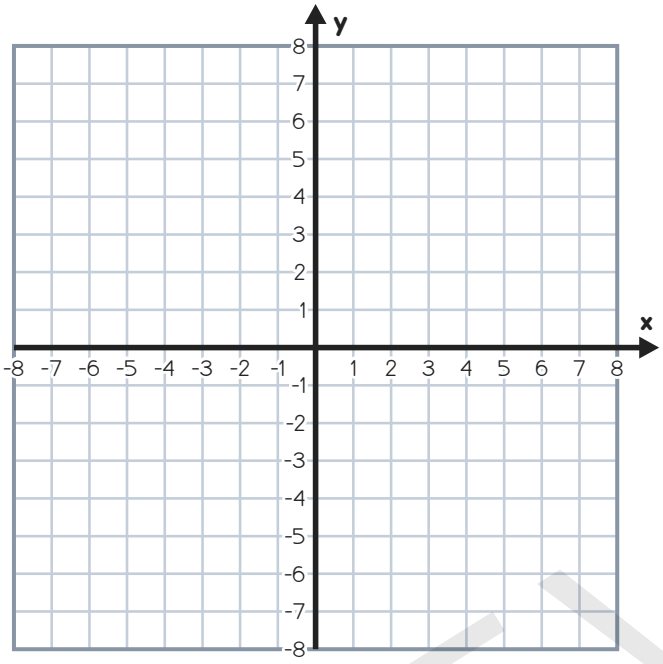
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Graph 4: On Your Own

Graph both lines. Find the solution.

Each grid goes from -8 to 8. Use a ruler and two colors if you can.



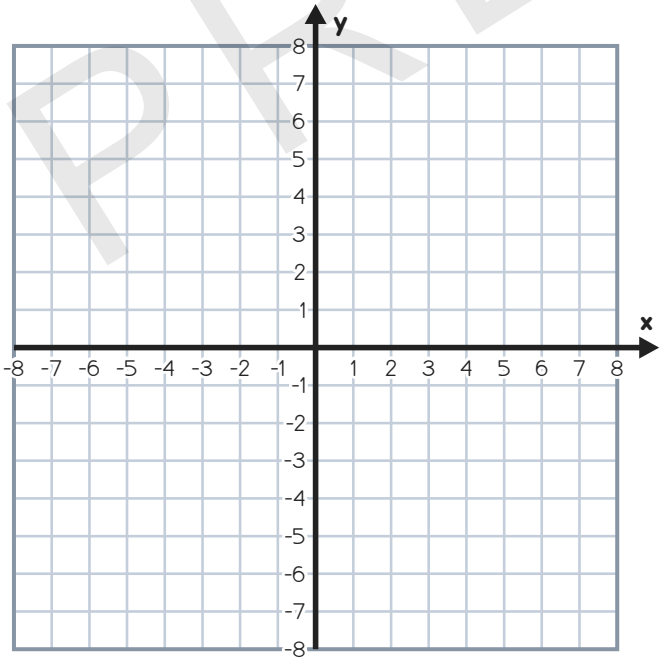
1 **A** $y = -3x + 2$

B $y = x - 6$

The lines cross at (☐ , ☐)

Check both equations.

☐ **A works** ☐ **B works**



2 **A** $y = \frac{2}{3}x - 1$

B $y = -x + 4$

The lines cross at (☐ , ☐)

Check both equations.

☐ **A works** ☐ **B works**

PREVIEW

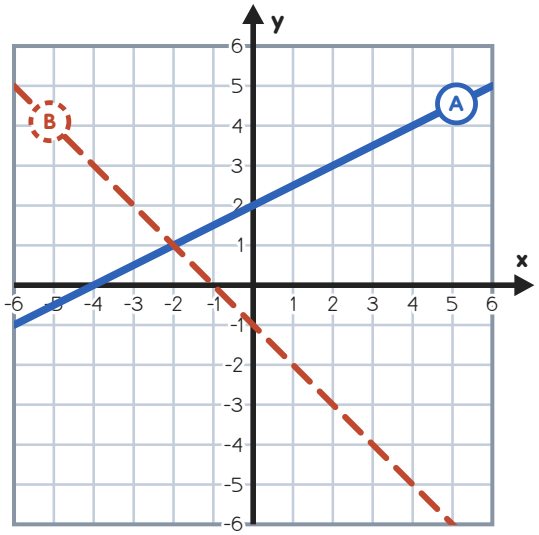
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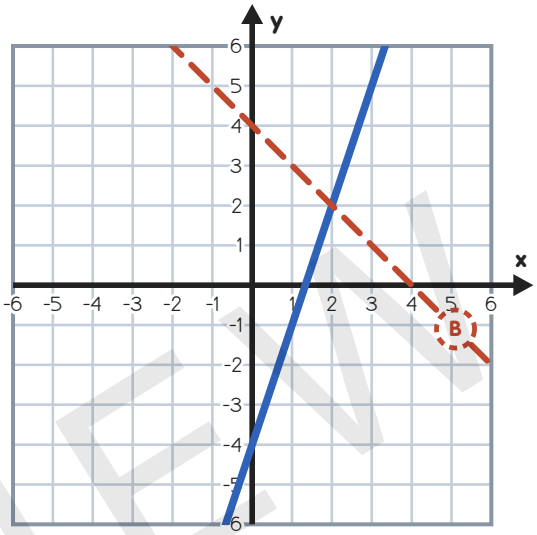
Read the Crossing 2

Look at the lines. Write the point where they cross.

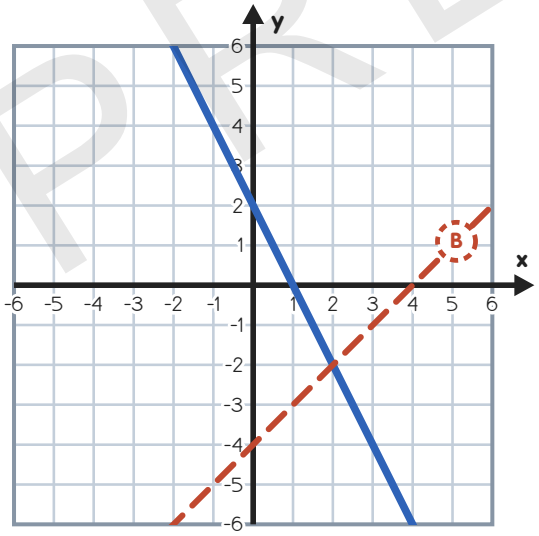
Line A is solid. Line B is dashed. Read the x number first, then the y number.



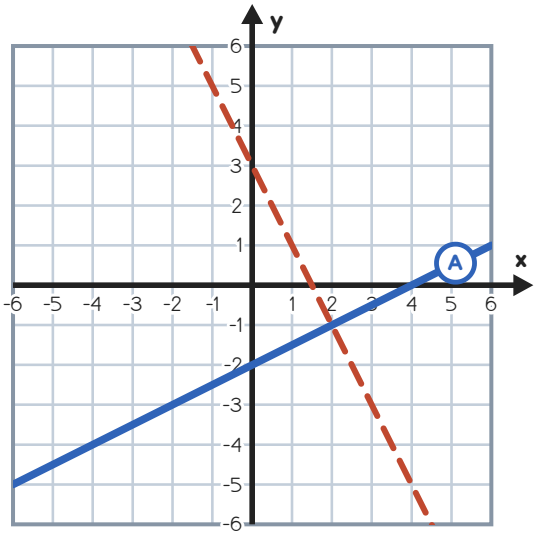
5 They cross at (____ , ____)



6 They cross at (____ , ____)



7 They cross at (____ , ____)



8 They cross at (____ , ____)

PREVIEW

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My name _____ Date _____

Check the Point 2

Put the point in both equations. Is it a solution?

Some lines are in standard form. Put x and y in the left side. Does it give the number on the right?

5 **Is (3, 4) a solution?**

A $x + y = 7$

B $y = x + 1$

A gives ☐ compare with 7

B gives ☐ compare with y = 4

☐ solution ☐ not a solution

Show your work.

6 **Is (2, -1) a solution?**

A $x - y = 3$

B $2x + y = 4$

A gives ☐ compare with 3

B gives ☐ compare with 4

☐ solution ☐ not a solution

Show your work.

7 **Is (2, 4) a solution?**

A $3x + y = 5$

B $y = 2x$

A gives ☐ compare with 5

B gives ☐ compare with y = 4

☐ solution ☐ not a solution

Show your work.

8 **Is (4, 2) a solution?**

A $x + 2y = 8$

B $y = x - 2$

A gives ☐ compare with 8

B gives ☐ compare with y = 2

☐ solution ☐ not a solution

Show your work.

PREVIEW

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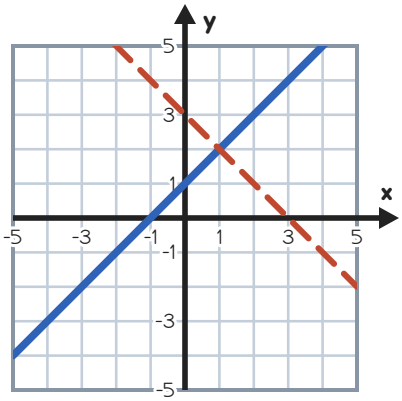
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How Many Solutions? Graphs

Look at the lines. Check one box.

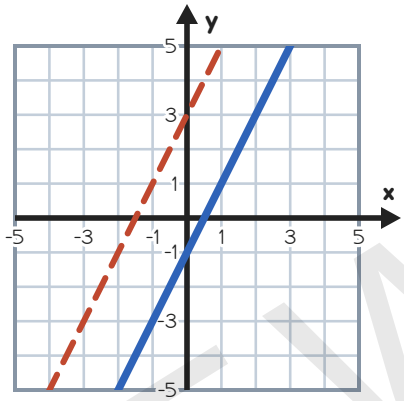
Line A is solid. Line B is dashed. Check one box. If there is one solution, write the point.

1 How many?



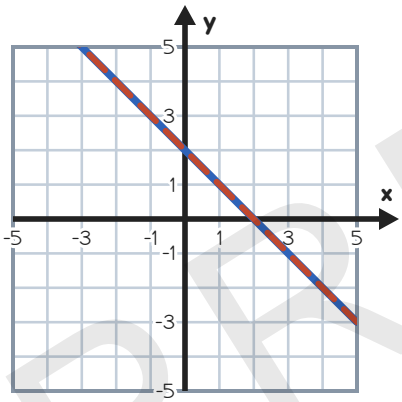
☐ one
☐ none
☐ infinite
(☐ , ☐)

2 How many?



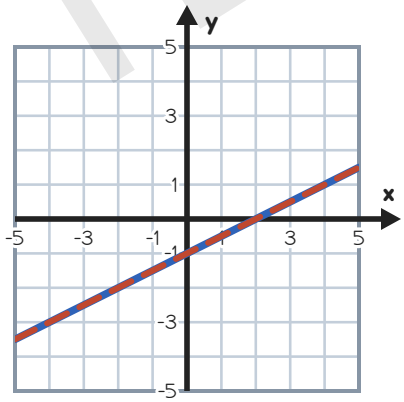
☐ one
☐ none
☐ infinite
(☐ , ☐)

3 How many?



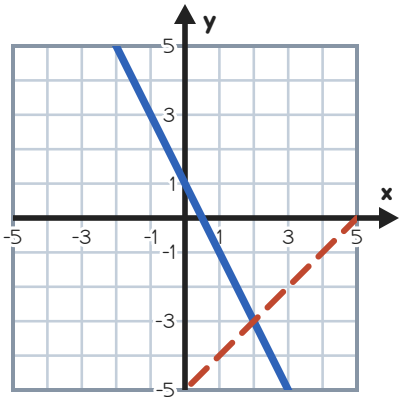
☐ one
☐ none
☐ infinite
(☐ , ☐)

4 How many?



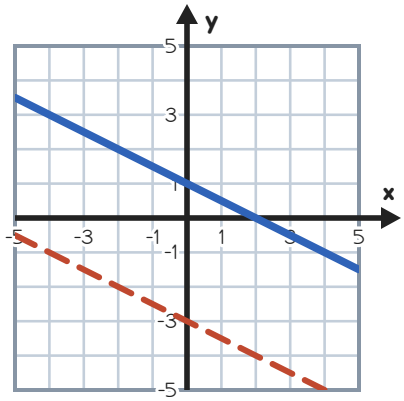
☐ one
☐ none
☐ infinite
(☐ , ☐)

5 How many?



☐ one
☐ none
☐ infinite
(☐ , ☐)

6 How many?



☐ one
☐ none
☐ infinite
(☐ , ☐)

PREVIEW

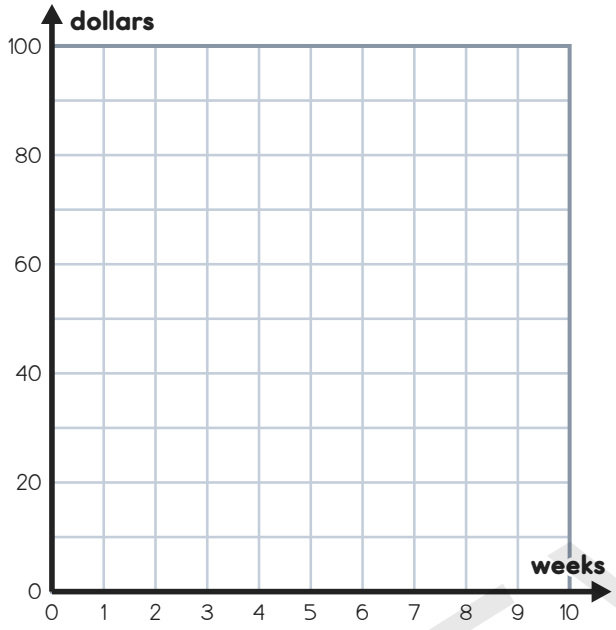
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My name _____ Date _____

Word Problems 2: On Your Own

Write the equations. Graph both lines.

Write y = mx + b for each. Graph both on the grid. Find where the lines cross.

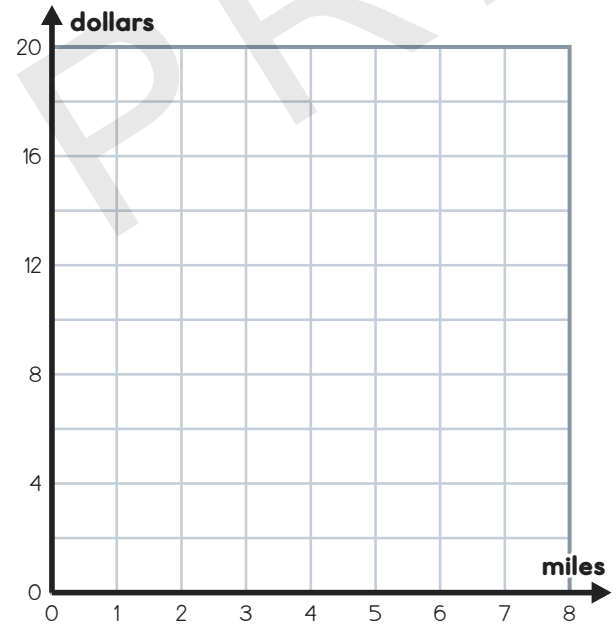


3 Saver A has 40 dollars and saves 5 dollars a week. Saver B has 10 dollars and saves 10 dollars a week. When will the two savers have the same amount?

Write both equations. Call the first one A.

They match at (____ , ____)

first box: weeks. second box: dollars.



4 Ride A charges 4 dollars plus 2 dollars a mile. Ride B charges 1 dollar plus 3 dollars a mile. When do the two rides cost the same?

Write both equations. Call the first one A.

They match at (____ , ____)

first box: miles. second box: dollars.

PREVIEW

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My name _____ Date _____

Find the Mistake

Find the mistake. Then fix it.

Devon is made up for practice. Each answer has one mistake.

1 **Devon was asked:**

Graph y = 2x - 3.

Devon put the first point at (-3, 0) and went up 2, right 1.

What is wrong?

Write it the right way.

2 **Devon was asked:**

Graph y = 1/2x + 1.

Devon started at (0, 1) and went right 1, up 2.

What is wrong?

Write it the right way.

3 **Devon was asked:**

The lines y = x + 1 and y = -x + 5 cross. What is the solution?

Devon wrote: the solution is x = 2.

What is wrong?

Write it the right way.

4 **Devon was asked:**

Is (1, -1) a solution of y = x - 2 and y = -2x + 4?

Devon checked only the first equation, found it true, and said yes.

What is wrong?

Write it the right way.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Quiz A

Pick the best answer. Write its letter.

Take your time. Guess if you are not sure.

1. What is the slope of the line y = -2x + 5?
   - **A** 5
   - **B** -2
   - **C** 2

2. Which point is the solution of y = x + 3 and y = -x + 7?
   - **A** (2, 5)
   - **B** (5, 2)
   - **C** (3, 6)

3. How many solutions does this system have? y = 2x + 1 and y = 2x - 5
   - **A** One solution
   - **B** Infinitely many solutions
   - **C** No solution

4. Is (3, 4) a solution of y = x + 1 and y = -x + 7?
   - **A** No, it works in only one
   - **B** Yes, it works in both
   - **C** No, it works in neither

5. Which point is the solution of y = 2x - 4 and y = -x + 5?
   - **A** (2, 3)
   - **B** (4, 4)
   - **C** (3, 2)

6. A gym costs y = 10x + 20 dollars after x months. What does the 20 mean?
   - **A** the joining fee
   - **B** the cost each month
   - **C** the number of months

PREVIEW

My name _____ Date _____

Exit Tickets

Answer each ticket before you go.

Each ticket takes about two minutes. Your teacher may collect them at the door.

1. The lines y = x + 1 and y = -x + 3 cross at one point. Write the point and show that it works in both equations.

2. Two lines have the same slope but different y-intercepts. How many solutions does the system have? Tell how you know.

3. Which part of today's work was hardest? Write one question you still have.

PREVIEW

Answer Key: Words, Slope, True or False

Every letter is the position of the right meaning in the printed list. Accept any wording that fixes a false sentence.

Systems Words page 7

Word	Letter	Meaning
1. system of equations	D	two or more equations that use the same variables
2. solution	F	an ordered pair (x, y) that makes both equations true
3. intersection	B	the point where two lines cross
4. parallel	E	lines that never cross; they have the same slope
5. slope	A	how steep a line is: rise over run
6. y-intercept	C	where a line crosses the y-axis, at the point (0, b)

Slope and y-Intercept page 10

Item	Line	Slope	y-intercept
10.1	$y = 3x + 2$	3	2
10.2	$y = -x + 5$	-1	5
10.3	$y = \frac{1}{2}x - 3$	1/2	-3
10.4	$y = -2x - 1$	-2	-1
10.5	$y = x - 4$	1	-4
10.6	$y = -\frac{3}{2}x + 2$	-3/2	2
10.7	$y = 4x$	4	0
10.8	$y = \frac{2}{3}x + 1$	2/3	1

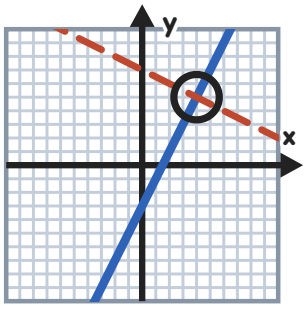
True or False page 25

Item	Answer	The fix
25.1	True	-
25.2	False	Parallel lines never cross, so there is no solution.
25.3	False	The slope is 2. The 5 is the y-intercept.
25.4	True	-
25.5	True	-
25.6	True	-
25.7	False	Start at the y-intercept, the point (0, -1) on the y-axis.
25.8	True	-

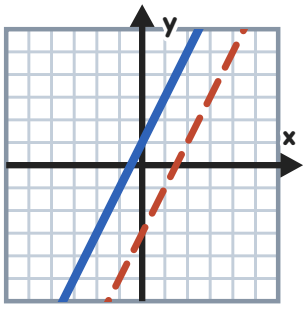
PREVIEW

Answer Key: Big Grid, Special Cases, Check the Point

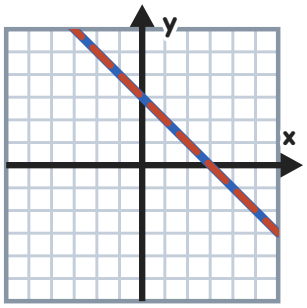
Each check puts the point in the equation as printed and compares it with y, or with the number on the right of a standard-form equation.



Page 15, the big grid
A: $y = 2x - 3$
B: $y = -\frac{1}{2}x + 7$
Cross at (4, 5)
A: $2 \times 4 - 3 = 5$; compare with $y = 5$: **true**
B: $(-1/2) \times 4 + 7 = 5$; compare with $y = 5$: **true**



Page 20, item 1
A: $y = 2x + 1$
B: $y = 2x - 3$
No solution. Both slopes are 2; the y-intercepts are 1 and -3. Parallel lines.



Page 20, item 2
A: $y = -x + 3$
B: $2x + 2y = 6$ ($y = -x + 3$)
Infinitely many solutions. $2x + 2y = 6$ becomes $y = -x + 3$, the same line as $y = -x + 3$.

Check the Point pages 18, 19

Item	Point	Line A	Line B	Result
18.1	(2, 3)	$y = x + 1$: $1 \times 2 + 1 = 3$; compare with $y = 3$: **true**	$y = -x + 5$: $(-1) \times 2 + 5 = 3$; compare with $y = 3$: **true**	Solution
18.2	(3, 5)	$y = 2x - 1$: $2 \times 3 - 1 = 5$; compare with $y = 5$: **true**	$y = -x + 8$: $(-1) \times 3 + 8 = 5$; compare with $y = 5$: **true**	Solution
18.3	(2, 3)	$y = 3x - 2$: $3 \times 2 - 2 = 4$; compare with $y = 3$: **false**	$y = -x + 6$: $(-1) \times 2 + 6 = 4$; compare with $y = 3$: **false**	Not a solution: works in neither
18.4	(1, -1)	$y = x - 2$: $1 \times 1 - 2 = -1$; compare with $y = -1$: **true**	$y = -2x + 4$: $(-2) \times 1 + 4 = 2$; compare with $y = -1$: **false**	Not a solution: works in A only
19.1	(3, 4)	$x + y = 7$: $1 \times 3 + 1 \times 4 = 7$; compare with 7: **true**	$y = x + 1$: $1 \times 3 + 1 = 4$; compare with $y = 4$: **true**	Solution
19.2	(2, -1)	$x - y = 3$: $1 \times 2 - 1 \times (-1) = 3$; compare with 3: **true**	$2x + y = 4$: $2 \times 2 + 1 \times (-1) = 3$; compare with 4: **false**	Not a solution: works in A only
19.3	(2, 4)	$3x + y = 5$: $3 \times 2 + 1 \times 4 = 10$; compare with 5: **false**	$y = 2x$: $2 \times 2 = 4$; compare with $y = 4$: **true**	Not a solution: works in B only
19.4	(4, 2)	$x + 2y = 8$: $1 \times 4 + 2 \times 2 = 8$; compare with 8: **true**	$y = x - 2$: $1 \times 4 - 2 = 2$; compare with $y = 2$: **true**	Solution

PREVIEW

Systems of Equations Tracker

One student, every scored sheet. Filled example: page 42.

Student _____ Teacher _____ Month _____

Page	Page type and set	Items	Right	Date	Notes
7	Systems Words	6			
10	Slope and y-Intercept	8			
11	Graph 1: Guided	2			
12	Graph 2: Less Help	2			
13	Graph 3: Standard Form	2			
14	Graph 4: On Your Own	2			
15	Graph 5: The Big Grid	1			
16	Read the Crossing 1	4			
17	Read the Crossing 2	4			
18	Check the Point 1	4			
19	Check the Point 2	4			
20	Graph 6: Special Cases	2			
21	How Many Solutions? Graphs	6			
22	How Many Solutions? Equations	6			
23	Word Problems 1: Guided	2			
24	Word Problems 2: On Your Own	2			
25	True or False	8			
26	Find the Mistake	4			
28	Quiz A	6			
29	Quiz B	6			
31	Cut and Sort: How Many Solutions?	9			
32	Cut and Sort: Which Step?	9			

How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 99 items on the 22 scored sheets. Answer keys: pages 33 to 37. Filled example: page 42.

This unit we are working on (your own standard or wording)

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Kind of sheet	Covered since last note (Y/N)	Items right	Still blank
Words and slope			
Graphing a system			
Reading the crossing			
Checking a point			
How many solutions			
Word problems			
True or false, mistakes			
Quizzes and sorts			

What I saw (observable, not a conclusion)

- Read ___ of 8 slopes and y-intercepts (page 10).
- Graphed ___ of 11 systems on a blank grid (pages 11 to 20, not in order).
- Read ___ of 8 crossing points off a drawn graph (pages 16, 17).
- Checked ___ of 8 points in both equations (pages 18, 19).
- Started at the y-intercept without a reminder: yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Got 7 of 8 true or false sentences right on 10/21. Next step: reread the four steps on page 6 and ask what parallel lines do." That is the level of detail this page is built for. It matches the filled example on page 42.

PREVIEW

Casey's Tracker (Invented Student)

Casey M. is invented; nothing on this page describes a real student. The blank tracker is on page 38.

Student: Casey M. (an invented student)

Teacher: Ms. Patel (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
7	Systems Words	6	5	10/6	Mixed up slope and y-intercept
10	Slope and y-Intercept	8	7	10/7	Read -x as a slope of 1
11	Graph 1: Guided	2	2	10/9	-
12	Graph 2: Less Help	2	1	10/10	Counted the run before the rise
13	Graph 3: Standard Form	2	1	10/13	Did not get y alone first
14	Graph 4: On Your Own	2	-	-	-
15	Graph 5: The Big Grid	1	-	-	-
16	Read the Crossing 1	4	4	10/14	-
17	Read the Crossing 2	4	3	10/15	Wrote the point as (y, x)
18	Check the Point 1	4	3	10/16	Checked only one equation
19	Check the Point 2	4	-	-	-
20	Graph 6: Special Cases	2	-	-	-
21	How Many Solutions? Graphs	6	5	10/20	Mixed up none and infinite
22	How Many Solutions? Equations	6	-	-	-
23	Word Problems 1: Guided	2	-	-	-
24	Word Problems 2: On Your Own	2	-	-	-
25	True or False	8	7	10/21	Thought parallel lines cross once
26	Find the Mistake	4	-	-	-
28	Quiz A	6	5	10/22	Missed the slope item
29	Quiz B	6	-	-	-
31	Cut and Sort: How Many Solutions?	9	-	-	-
32	Cut and Sort: Which Step?	9	-	-	-

PREVIEW

How to read it

Casey M. has done **11 of 22** scored sheets and got **43 of 52** items right with no prompt. **2** sheets were all right and **9** carry a note. Every number comes from the table.

What the table points to

The lowest sheets are Graph 2: Less Help (1 of 2) and Graph 3: Standard Form (1 of 2). That is where the next practice goes. The 11 sheets left blank are not tried yet, never wrong.