

Grade 8 · Systems of Linear Equations · Worksheet Answer Key

Common Core 8.EE.C.8a, 8.EE.C.8b, 8.EE.C.8c · mathovore.fr

Every solution below shows the steps and a check in the original equations. Final answers are in bold. If your answer differs, substitute it into both equations to find which one fails, then look for a sign error in the elimination or substitution step.

Grade 8 Common Core: 8.EE.C.8a · 8.EE.C.8b · 8.EE.C.8c

Problem 1: Is it a solution?

First equation: $2(2) - 1 = 3$, which matches $y = 3$.

Second equation: $-2 + 5 = 3$, which also matches.

The pair satisfies both equations, so **yes, $(2, 3)$ is a solution.**

Problem 2: Test an ordered pair

First equation: $4 + 1 = 5$, which is true.

Second equation: $4 - 1 = 3$, but the equation needs 2, so it is false.

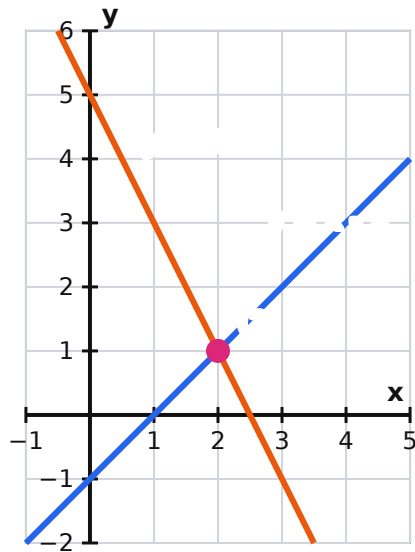
The pair fails the second equation, so **no, $(4, 1)$ is not a solution.**

Problem 3: Read the intersection

The lines cross at $(2, 1)$.

Check: $2 - 1 = 1$ and $-2(2) + 5 = 1$. Both are true.

The solution is $(2, 1)$.



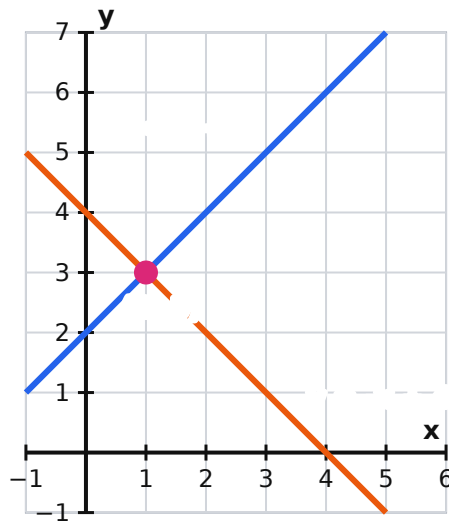
The intersection point is $(2,1)$.

Problem 4: Solve by graphing

The line $y = x + 2$ has y-intercept 2 and slope 1. The line $y = -x + 4$ has y-intercept 4 and slope -1 .

They cross at $(1,3)$.

Check: $1+2=3$ and $-1+4=3$. The solution is $(1,3)$.



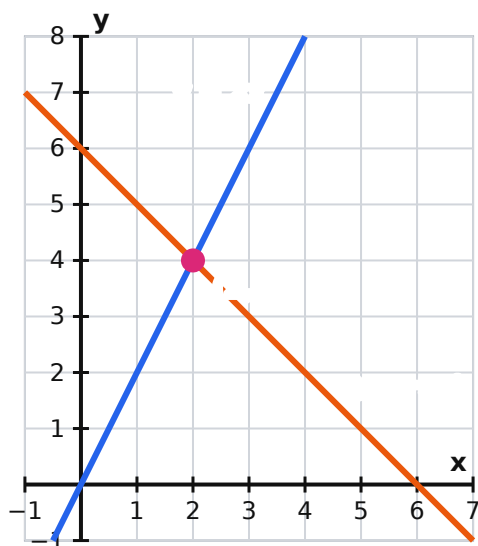
Both lines pass through $(1,3)$.

Problem 5: Graph two lines

The line $y = 2x$ passes through $(0,0)$ and $(1,2)$. The line $y = -x + 6$ passes through $(0,6)$ and $(6,0)$.

They cross at $(2,4)$. Check: $2(2)=4$ and $-2+6=4$.

The solution is $(2,4)$.



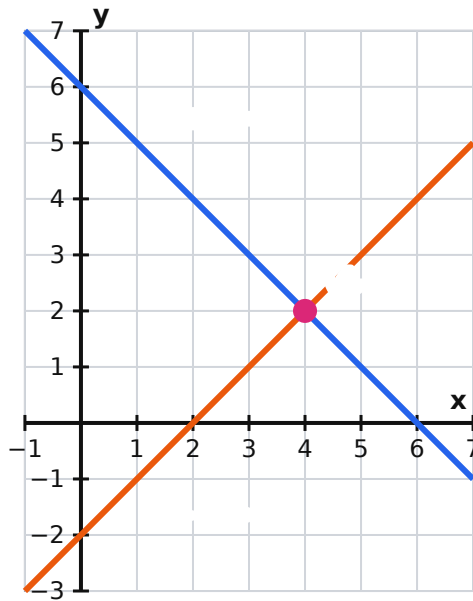
The solution is $(2,4)$.

Problem 6: Standard form on a grid

Intercepts of $x+y=6$: $(6,0)$ and $(0,6)$. Intercepts of $x-y=2$: $(2,0)$ and $(0,-2)$.

The lines cross at $(4,2)$. Check: $4+2=6$ and $4-2=2$.

The solution is $(4,2)$.



Both lines pass through $(4, 2)$.

Problem 7: Substitute a product

Replace y with $3x$: $x + 3x = 12$.

$4x = 12$, so $x = 3$.

$y = 3(3) = 9$.

Check: $3 + 9 = 12$. The solution is $(3, 9)$.

Problem 8: Substitute a sum

Replace y with $x + 4$: $2x + (x + 4) = 13$.

$3x + 4 = 13$, so $3x = 9$ and $x = 3$.

$y = 3 + 4 = 7$.

Check: $2(3) + 7 = 13$. The solution is $(3, 7)$.

Problem 9: Two expressions for y

Both expressions equal y , so set them equal: $2x - 3 = x + 2$.

Subtract x : $x - 3 = 2$. Add 3: $x = 5$.

$y = 5 + 2 = 7$.

Check: $2(5)-3=7$. The solution is $(5,7)$.

Problem 10: Substitute for x

Replace x with $2y+1$: $3(2y+1)-y=8$.

Distribute: $6y+3-y=8$, so $5y=5$ and $y=1$.

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

Check: $3(3)-1=8$. The solution is $(3,1)$.

Problem 11: Add the equations

Add the equations: $2x=14$, so $x=7$.

Then $7+y=10$ gives $y=3$.

Check: $7-3=4$. The solution is $(7,3)$.

Problem 12: Opposite coefficients

The y -terms are opposites. Add: $5x=20$, so $x=4$.

Then $2(4)+y=11$ gives $y=3$.

Check: $3(4)-3=9$. The solution is $(4,3)$.

Problem 13: Eliminate y

Add the equations: $4x=20$, so $x=5$.

Then $5-2y=1$ gives $-2y=-4$ and $y=2$.

Check: $3(5)+2(2)=19$. The solution is $(5,2)$.

Problem 14: Multiply one equation

Multiply the second equation by -2 : $-2x-2y=-10$.

Add to the first equation: $y=3$.

Then $x+3=5$ gives $x=2$.

Check: $2(2)+3(3)=13$. The solution is $(2,3)$.

Problem 15: Make y cancel

Multiply the second equation by 2: $4x - 2y = 2$.

Add to the first: $7x = 14$, so $x = 2$.

Then $2(2) - y = 1$ gives $y = 3$.

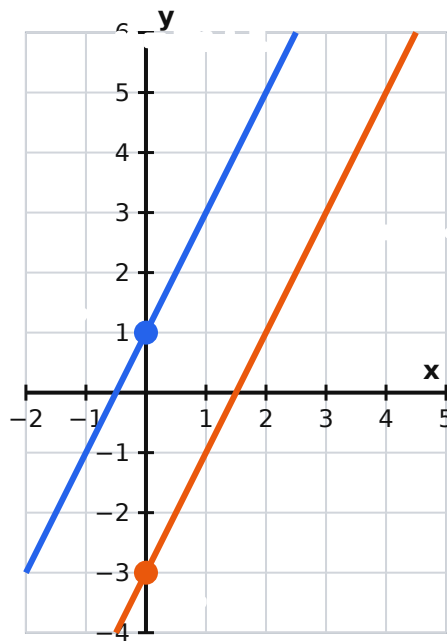
Check: $3(2) + 2(3) = 12$. The solution is $(2, 3)$.

Problem 16: Parallel lines

Both lines have slope 2, but the y-intercepts are 1 and -3 .

Parallel lines never cross. Setting the equations equal gives $2x + 1 = 2x - 3$, which simplifies to $1 = -3$, which is false.

The system has **no solution**.



The lines have the same slope and different y-intercepts.

Problem 17: No solution by inspection

The same expression $3x + 2y$ would have to equal both 5 and 6 for the same x and y , which is impossible.

Subtracting the equations gives $0 = -1$, a false statement.

No solution; the lines are parallel.

Problem 18: Same line twice

Solve the second equation for y : $-2y = -6x + 4$, so $y = 3x - 2$.

This is the same equation as the first, so the graphs are the same line.

The system has **infinitely many solutions**; every point on the line works.

Problem 19: Movie tickets

Let a be adult tickets and c be child tickets.

$$a + c = 8 \text{ and } 9a + 6c = 57.$$

Substitute $c = 8 - a$: $9a + 6(8 - a) = 57$, so $3a + 48 = 57$ and $a = 3$.

$$c = 8 - 3 = 5.$$

Check: $9(3) + 6(5) = 27 + 30 = 57$. She bought **3 adult and 5 child tickets**.

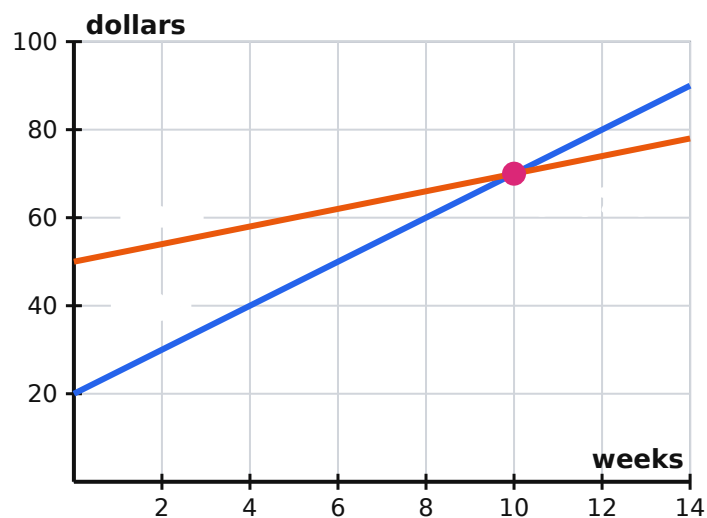
Problem 20: Saving money

Let w be weeks and s the savings: $s = 20 + 5w$ and $s = 50 + 2w$.

Set equal: $20 + 5w = 50 + 2w$, so $3w = 30$ and $w = 10$.

$$s = 20 + 5(10) = 70. \text{ Check: } 50 + 2(10) = 70.$$

They have equal savings after **10 weeks, with \$70 each**.



The lines meet at $(10, 70)$.

Problem 21: Phone plans

Let m be minutes: $C = 20 + 0.10m$ and $C = 10 + 0.20m$.

Set equal: $20 + 0.10m = 10 + 0.20m$, so $10 = 0.10m$ and $m = 100$.

Cost: $20 + 0.10(100) = 30$. Check: $10 + 0.20(100) = 30$.

The plans cost the same at **100 minutes, \$30**.

Problem 22: Bake sale

Let m be muffins and k cookies: $m + k = 30$ and $3m + 2k = 70$.

Multiply the first by -2 : $-2m - 2k = -60$. Add to the second: $m = 10$.

$k = 30 - 10 = 20$.

Check: $3(10) + 2(20) = 70$. He sold **10 muffins and 20 cookies**.

Problem 23: Coins in a jar

Let n be nickels and d dimes: $n + d = 15$ and $5n + 10d = 120$.

Substitute $n = 15 - d$: $5(15 - d) + 10d = 120$, so $75 + 5d = 120$ and $d = 9$.

$n = 6$.

Check: $6(5) + 9(10) = 30 + 90 = 120$. She has **6 nickels and 9 dimes**.

Problem 24: Two numbers

Let the numbers be x and y : $x + y = 24$ and $x - y = 6$.

Add: $2x = 30$, so $x = 15$. Then $y = 24 - 15 = 9$.

Check: $15 - 9 = 6$. The numbers are **15 and 9**.