6.1 – 6.4 Systems of Linear Equations Review

Key

Classify each system of equations.

1. $y = x - 1$
$y = -x + 1$

Consistent & Independent

2. $x - y = -4$ → $y = x + 4$
$y = x + 4$

consistent & dependent (same line!)

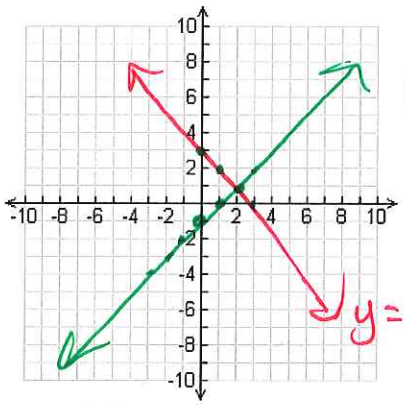
3. $y = x + 4$
$2x - 2y = 2$ ⇒ $-2y = -2x + 2$, $y = x - 1$

inconsistent (parallel lines)

Solve each system by graphing

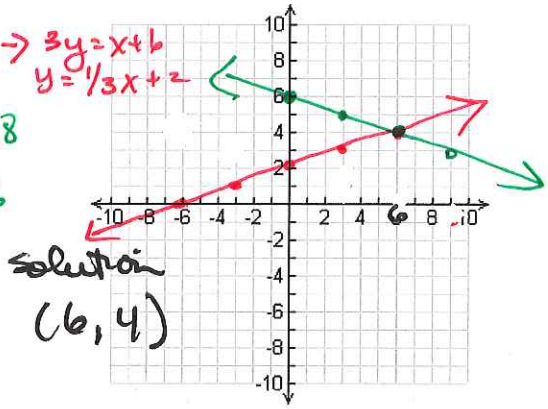
4. $y = x - 1$
$x + y = 3$

$y = -x + 3$



Solution: (2, 1)

5. $-x + 3y = 6$ → $3y = x + 6$, $y = \frac{1}{3}x + 2$
$x + 3y = 18$ → $3y = -x + 18$, $y = -\frac{1}{3}x + 6$



Solution (6, 4)

Solve each system by substitution

6. $y = x + 5$
$4x + y = 20$

$4x + x + 5 = 20$
$5x + 5 = 20$
$5x = 15$
$x = 3$
$y = x + 5$
$y = 3 + 5$
$y = 8$
(3, 8)

7. $x = y - 8$
$-x - y = 0$

$-(y - 8) - y = 0$
$-y + 8 - y = 0$
$-2y + 8 = 0$
$-2y = -8$
$y = 4$
$x = y - 8$
$x = 4 - 8$
$x = -4$
(−4, 4)

8. $y = 2x + 10$
$y = -2x - 6$

$2x + 10 = -2x - 6$
$+2x \quad +2x$
$4x + 10 = -6$
$-10 \quad -10$
$4x = -16$
$x = -4$
$y = 2x + 10$
$y = 2(-4) + 10$
$= -8 + 10$
$y = 2$
(−4, 2)

Use elimination to solve each system of equations.

9. $x - y = 1$
$+ \quad x + y = -9$

$2x = -8$
$x = -4$
$x + y = -9$
$-4 + y = -9$
$+4 \quad +4$
$y = -5$
(−4, −5)
Solution

10. $3x + 4y = 19$
$-(3x + 6y = 33)$

$-2y = -14$
$y = 7$
$3x + 4y = 19$
$3x + 4(7) = 19$
$3x + 28 = 19$
$3x = -9$
$x = -3$
(−3, 7)
Solution

11. $2(x - 0.25y = 6)$ ⇒ $2x - .5y = 12$
$+ \quad 0.5x + 0.5y = -2$ $+ .5x + .5y = -2$

$2.5x = 10$
$x = 4$
$.5(4) + .5y = -2$
$2 + .5y = -2$
$-2 \quad -2$
$.5y = -4$
$.5 \quad .5$
$y = -8$
(4, −8)
Solution

12. Use algebra to determine if (2, −3) is a solution to the system: $7x + 4y = 2$, $7x + 2y = 8$

$7(2) + 4(-3) = 2$
$14 - 12 = 2$
$2 = 2$ ✓

$7(2) + 2(-3) = 8$
$14 - 6 = 8$
$8 = 8$ ✓

yes! (2, −3) is on both lines.

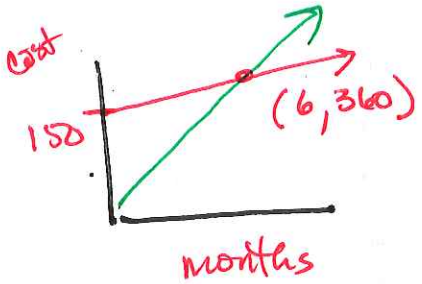
13. **Recreation** Casey wants to buy a gym membership. One gym has a $150 joining fee and costs $35 per month. Another gym has no joining fee and costs $60 per month.

a. In how many months will both gym memberships cost the same? What will that cost be?

b. If Casey plans to cancel in 5 months, which is the better option for him? Explain.

Cost = 150 + 35m

Cost = 60m



(a) Cost = Cost

$60m = 150 + 35m$

$25m = 150$

$m = 6$

in 6 months - the costs are the same for either gym

(b) If Casey cancels in 5 months, the gym w/ no joining fee & higher monthly charge is cheaper

14. **MONEY** Harvey has some $1 bills and some $5 bills. In all, he has 6 bills worth $22. Let x be the number of $1 bills and let y be the number of $5 bills. Write a system of equations to represent the information and use substitution to determine how many bills of each denomination Harvey has.

let x = #1

let y = #5

$\begin{cases} x+y=6 \\ x+5y=22 \end{cases}$

$x+y=6$

$+\ -x-5y=-22$

$-4y=-16$

$y=4$

$x+y=6$

$x+4=6$

$x=2$

Harvey has 4, #5 bills & 2, #1 bills

15. **CANOEING** Laura and Brent paddled a canoe 6 miles upstream in four hours. The return trip took three hours. Find the rate at which Laura and Brent paddled the canoe in still water.

let r = rate in still water

let c = current

	rate	time	distance
upstream	r − c	4 hrs	6 miles
downstream	r + c	3 hrs	6 miles

$r \cdot t = d$

$4(r-c)=6$

$3(r+c)=6$

$3(4r-4c=6)$ $12r-12c=18$

$4(3r+3c=6)$ $12r+12c=24$

$24r=42$

$r=2$

paddling 2 mph

16. Four times one number added to another number is 36. Three times the first number minus the other number is 20. Find the numbers.

let x = 1st #

let y = 2nd #

$4x+y=36$

$+\ 3x-y=20$

$7x=56$

$x=8$

$4x+y=36$

$4(8)+y=36$

$32+y=36$

$y=4$

1st # = 8

2nd # = 4