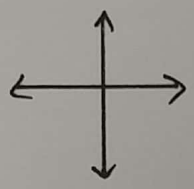
SECTION 5.1 – SYSTEMS OF LINEAR EQUATIONS

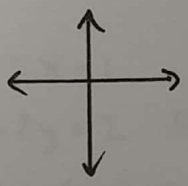
* 2 OR MORE EQUATIONS WITH THE SAME VARIABLE ARE REFERRED TO AS A _____.

* A SYSTEM OF 2 EQUATIONS WILL HAVE:

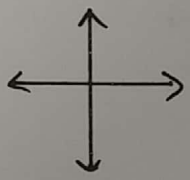
(1) EXACTLY 1 SOLUTION :



(2) AN INFINITE # OF SOLUTIONS :



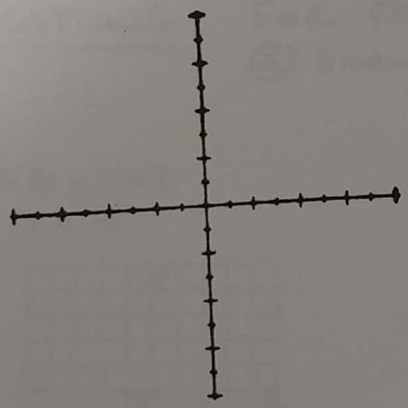
(3) NO SOLUTIONS :



PART 1 : SOLVING GRAPHICALLY (CALCULATOR ACTIVE)

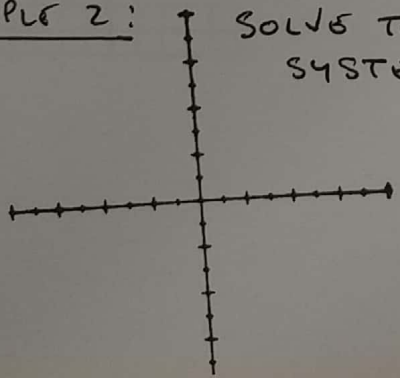
EXAMPLE 1 : SOLVE THE SYSTEM: $y = x - 1$, $y = -x + 1$ GRAPHICALLY.

SKETCH GRAPHS + LABEL SOLUTION.

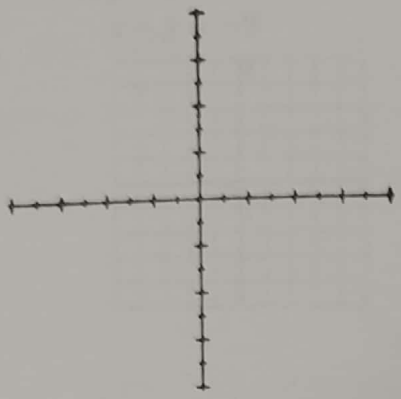


EXAMPLE 2 : SOLVE THE SYSTEM $y = 2x - 3$, $2x + y = 4$ GRAPHICALLY.

SKETCH GRAPHS + LABEL SOLUTION.

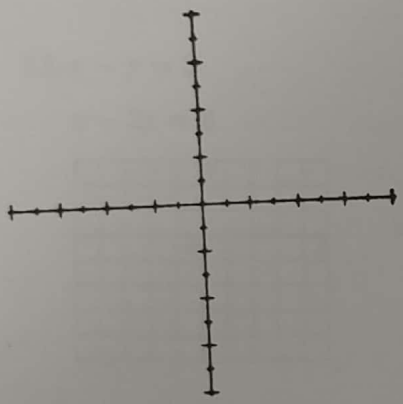


EXAMPLE 3: SOLVE THE SYSTEM $y = x + 4$, $y = x - 1$ GRAPHICALLY.



SKETCH GRAPHS + LABEL SOLUTION.

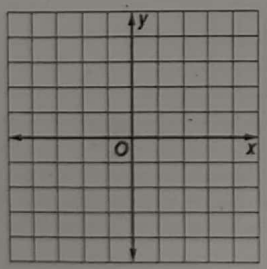
EXAMPLE 4: SOLVE THE SYSTEM $y = x - 1$, $2x - 2y = 2$ GRAPHICALLY.



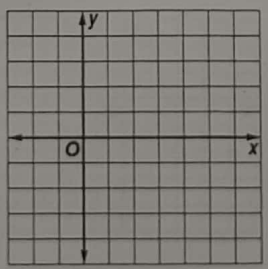
SKETCH GRAPHS + LABEL SOLUTION.

APPLICATIONS: FOR EACH SYSTEM OF EQUATIONS: (A) DRAW GRAPHS, (B) NAME AND LABEL THE SOLUTION.

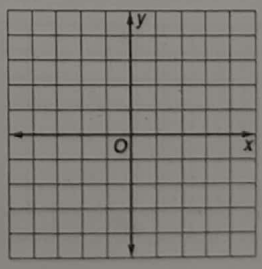
5. $2x - y = 1$
$y = -3$



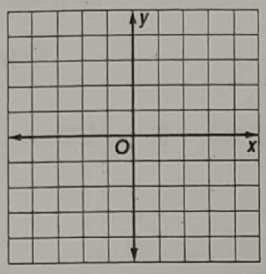
6. $x = 1$
$2x + y = 4$



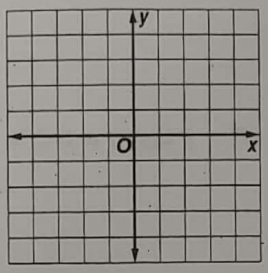
7. $3x + y = -3$
$3x + y = 3$



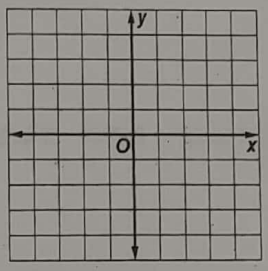
8. $y = x + 2$
$x - y = -2$



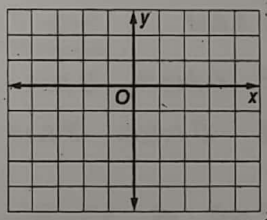
9. $x + 3y = -3$
$x - 3y = -3$



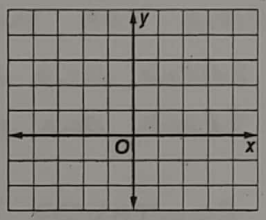
10. $y - x = -1$
$x + y = 3$



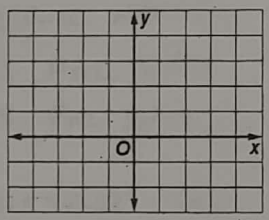
11. $x - y = 3$
$x - 2y = 3$



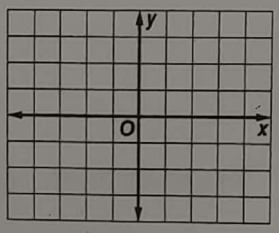
12. $x + 2y = 4$
$y = -\frac{1}{2}x + 2$



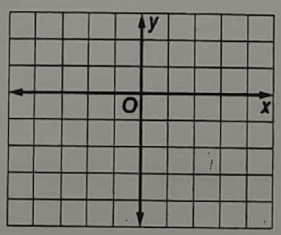
13. $y = 2x + 3$
$3y = 6x - 6$



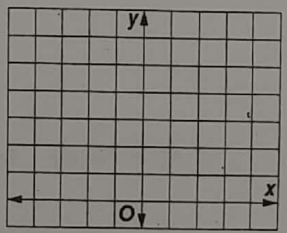
5. $3x - y = -2$
$3x - y = 0$



6. $y = 2x - 3$
$4x = 2y + 6$



7. $x + 2y = 3$
$3x - y = -5$



EXAMPLE 5. JOE AND JOSH EACH WANT TO BUY A VIDEO GAME. JOE HAS $14 AND SAVES $10 PER WEEK. JOSH HAS $26 AND SAVES $7 PER WEEK. IN HOW MANY WEEKS WILL THEY HAVE THE SAME AMOUNT?

(A) WRITE A SYSTEM OF EQUATIONS TO REPRESENT THE SITUATION.

(B) GRAPH THE SYSTEM USING AN APPROPRIATE WINDOW. SKETCH YOUR GRAPH BELOW.

(C) DETERMINE THE SOLUTION, STATING IT IN CONTEXT.

APPLICATION. MARY AND SUE ARE READING A GRAPHIC NOVEL. MARY HAS READ 35 PAGES AND READS 20 PAGES PER DAY. SUE HAS READ 85 PAGES AND READS 10 PAGES PER DAY.

(A) WRITE A SYSTEM OF EQUATIONS TO REPRESENT THE SITUATION:

(B) GRAPH THE SYSTEM USING AN APPROPRIATE WINDOW. SKETCH YOUR GRAPH BELOW.

(C) DETERMINE THE SOLUTION, STATING IT IN CONTEXT.

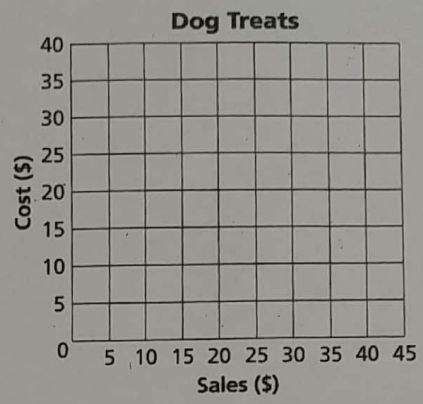
PRACTICE. COMPLETE THESE PROBLEMS WITHOUT A CALCULATOR.

(1)

BUSINESS Nick plans to start a home-based business producing and selling gourmet dog treats. He figures it will cost \$20 in operating costs per week plus \$0.50 to produce each treat. He plans to sell each treat for \$1.50.

a. Graph the system of equations $y = 0.5x + 20$ and $y = 1.5x$ to represent the situation.

b. How many treats does Nick need to sell per week to break even?



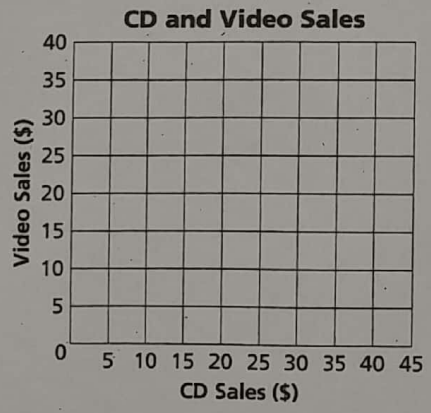
(2)

SALES A used book store also started selling used CDs and videos. In the first week, the store sold 40 used CDs and videos, at \$4.00 per CD and \$6.00 per video. The sales for both CDs and videos totaled \$180.00

a. Write a system of equations to represent the situation.

b. Graph the system of equations.

c. How many CDs and videos did the store sell in the first week?



(3) WHICH OF THE FOLLOWING SYSTEMS OF EQUATIONS DOES NOT BELONG WITH THE OTHER 3? EXPLAIN!

$4x - y = 5$
$-2x + y = -1$

$-x + 4y = 8$
$3x - 6y = 6$

$4x + 2y = 14$
$12x + 6y = 18$

$3x - 2y = 1$
$2x + 3y = 18$