p. 151 #18-24

18. no sol'n

20. no sol'n

22. one sol'n

24. infinitely many solutions

#20 $\begin{cases} 4x+8y=12 \\ x+2y=-3 \end{cases}$

$4x+8y=12$

$x+2y=3$

$2y=-x+3$

$y=-\frac{1}{2}+\frac{3}{2}$

$m=-\frac{1}{2}$

$b=\frac{3}{2}$

$x+2y=-3$

$2y=-x-3$

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

$m=-\frac{1}{2}$

$b=-\frac{3}{2}$

no solution

#22 p. 151 $\begin{cases} x=6 \\ y=-2 \end{cases}$ $m=\infty$ (vertical) $m=0$ (horizontal)

cannot put $x=6$ into $y=mx+b$ form

slopes different ($0 \neq \infty$)

one solution

#24 $\begin{cases} x-3y=2 \\ 4x-12y=8 \end{cases}$

$x-3y=2$ $\longleftrightarrow$ $4x-12y=8$

$m=\frac{1}{3}$ $b=-\frac{2}{3}$ $x-3y=2$

$-3y=-x+2$

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

$m=\frac{1}{3}$ $b=-\frac{2}{3}$

infinitely many solutions

Topic: solving linear system by ELIMINATION method

Basic idea: standard form

$Ax + By = C$

A, B, C are numbers
x, y are variables

example: $2x - 3y = 17$

$A = 2 \quad B = -3 \quad C = 17$

$Ax + By = C$

$\times 2 \quad 2Ax + 2By = 2C$ legal!

same solution!
same graph!

$\times -3 \quad -3Ax - 3By = -3C$ legal!

same sol'n and graph!

Example:

$\times(5)\ 2x+7y=4$
$\times(-7)\ 3x+5y=-5$

least common multiple of 7, 5 is 35

$10x+35y=20$
$-21x-35y=35$

$-11x = 55$

$x=-5$

$2(-5)+7y=4$

$-10+7y=4$

$7y=14$

$y=2$

solution: $x=-5$ $y=2$

$(-5,2)$

Example:

$\times(3)\ 2x+7y=4$
$\times(-2)\ 3x+5y=-5$

least common multiple of 2, 3 is 6

$6x+21y=12$
$-6x-10y=10$

$11y=22$

$y=2$

$2x+7(2)=4$

$2x+14=4$

$2x=-10$

$x=-5$

solution:

$x=-5$ $y=2$

$(-5,2)$

What happens if:

① both variables are eliminated, and you get $0 = 5$

no solution

② both variables are eliminated, and you get $0 = 0$

infinitely many Sol.