Name Key Date _____ Pd ____

4.4 Solving Systems of Three Variables

I. Check the solutions provided to show if the solution is correct or if it is false. Use work to show it is a solution, and use some work with written explanation when the solution is NOT true.

1. $-x-5y-5z=2$ (-2, -3, 3)
$4x-5y+4z=19$
$x+5y-z=-20$

① $-(-2)-5(-3)-5(3)=2$
$2+15-15=2$ ✓

② $4(-2)-5(-3)+4(3)=19$
$-8+15+12=19$ ✓

③ $(-2)+5(-3)-(3)=-20$
$-2-15-3=-20$ ✓

Yes

2. $-4x-5y-z=18$ (-4, 0, -2)
$-2x-5y-2z=12$
$-2x+5y+2z=4$

① $-4(-4)-5(0)-(-2)=18$
$16-0+2=18$ ✓

② $-2(-4)-5(0)-2(-2)=12$
$8+0+4=12$ ✓

③ $-2(-4)+5(0)+2(-2)=4$
$8+0-4=4$ ✓

Yes

II. Determine which of the two solutions, both, or none are the actual solution(s) to the system of equations.

3. $-x-5y+z=17$
$-5x-5y+5z=5$
$2x+5y-3z=-10$
(-1, -4, -4) ; (1, 4, 4)

Yes NO

① $-(-1)-5(-4)+(-4)=17$
$1+20-4=17$ ✓

② $-5(-1)-5(-4)+5(-4)=5$
$5+20-20=5$ ✓

③ $2(-1)+5(-4)-3(-4)=-10$
$-2-20+12=-10$ ✓

① $-(1)-5(4)+4=17$
$-1-20+4=17$ X

4. $4x+4y+z=24$
$2x-4y+z=0$
$5x-4y-5z=12$
(4, 2, 0); (1, 3, 1)

Yes NO

① $4(4)+4(2)+0=24$
$16+8+0=24$ ✓

② $2(4)-4(2)+0=0$
$8-8+0=0$ ✓

③ $5(4)-4(2)-5(0)=12$
$20-8-0=12$ ✓

① $4(1)+4(3)+1=24$
$4+12+1=24$ X

III. Review and Preview

Translating. Show all work. Box your final answer.

5. The sum of two numbers is 45 and one number is twice the other. Find the numbers.

$x+y=45$ $\quad x=2y$
$2y+y=45$ $\quad x=2(15)$
$3y=45$ $\quad y=15$ $\quad x=30$

30 & 15

6. The difference of two numbers is 5. Twice the smaller number added to five times the larger number is 53. Find the numbers.

$x-y=5$ $\quad 2x+5y=53$
$(5)\,5x-5y=25$ $\quad +5x-5y=25$
$\quad 7x=78$

$x=\frac{78}{7}$

$7\left(\frac{78}{7}-y=5\right)$
$78-7y=35$
$-7y=-43$
$y=\frac{43}{7}$

$\frac{43}{7}, \frac{78}{7}$

Solve. Show all work. Box your final answer.

7. $2(x-1)-3x=x-12$

$2x-2-3x=x-12$
$-x-2=x-12$
$-2=2x-12$
$10=2x$
$5=x$

8. $7(2x-1)+4=11(3x-2)$

$14x-7+4=33x-22$
$14x-3=33x-22$
$-3=19x-22$
$19=19x$
$1=x$

9. $-y-5(y+5)=3y-10$

$-y-5y-25=3y-10$
$-6y-25=3y-10$
$-25=9y-10$
$3\div\ \frac{-15}{9}=\frac{9y}{9}$

$-\frac{5}{3}=y$

10. $z-3(z+7)=6(2z+1)$

$z-3z-21=12z+6$
$-2z-21=12z+6$
$-21=14z+6$
$\frac{-27}{14}=\frac{14z}{14}$

$-\frac{27}{14}=z$

11. What would a graph look like for a system of linear equations in three variables if the solution was...

a) one solution?

intersecting lines.

b) no solution?

parallel lines.

c) infinitely many solutions?

coinciding lines