#4

$$\begin{cases} 12x - 4y = 20 \\ 18x = 6y + 30 \end{cases}$$

$3x - y = 5$

$-(3x - y \pm 5)$

$0 = 0$

Inf. many solutions

$y = 3x + 5$

$\frac{3x}{3} = \frac{5}{3} + \frac{y}{3}$

$x = \frac{5}{3} + \frac{1}{3}y$

$(a, 3a+5)$

$(\frac{1}{3}a + \frac{5}{3}, a)$

#5

$$\begin{cases} 2x + 3y + 5z = 14 \\ 3(3x - y + 4z = 79) \\ x + 3y + 2z = -19 \end{cases}$$

$9x - 3y + 12z = 237$

$5(11x + 17z = 251)$

$-11(5x + 7z = 109)$

$55x + 85z = 1255$

$-55x - 77z = -1199$

$8z = 56$

$z = 7$

$(12, -15, 7)$

$5x + 17(7) = 109$

$-49 \quad -49$

$5x = 60$

$x = 12$ $y = -15$

$12 + 3y + 4 = -19$

$-26 \quad -26$

$3y = -45$

#6

$$\begin{cases} x-3y+7z=13 \\ 2x-y-z=36 \\ 5x+2y-16z=99 \end{cases}$$

$-2R_1+R_2 \rightarrow (5y-15z=10) \div 5$

$-5R_1+R_3 \rightarrow (17y-51z=34) \div 17$

$y-3z=2$

$y=3z+2$

$x-3(3a+2)+7a=13$

$x-9a-6+7a=13$

$+6 \quad +2a \quad +6 \quad +2a$

$x=19+2a$

$(2a+19,\ 3a+2,\ a)$

$(2a+19,\ 3a+2,\ a)$ $\quad (b,\ \frac{3}{2}b-\frac{57}{2},\ b/2-19/2)$

Let $x=b$

$b=2a+19$

$-19 \quad -19$

$\frac{b}{2}-\frac{19}{2}=\frac{2a}{2}$

$a=\frac{b}{2}-\frac{19}{2}$

$3\left(\frac{b}{2}-\frac{19}{2}\right)+2$

$\frac{3b}{2}-\frac{57}{2}+\frac{4}{2}$

Let $y=c$ $\quad \left(\frac{2c}{3}+\frac{53}{3},\ c,\ c/3-2/3\right)$

$c=3a+2$

$-2 \quad -2$

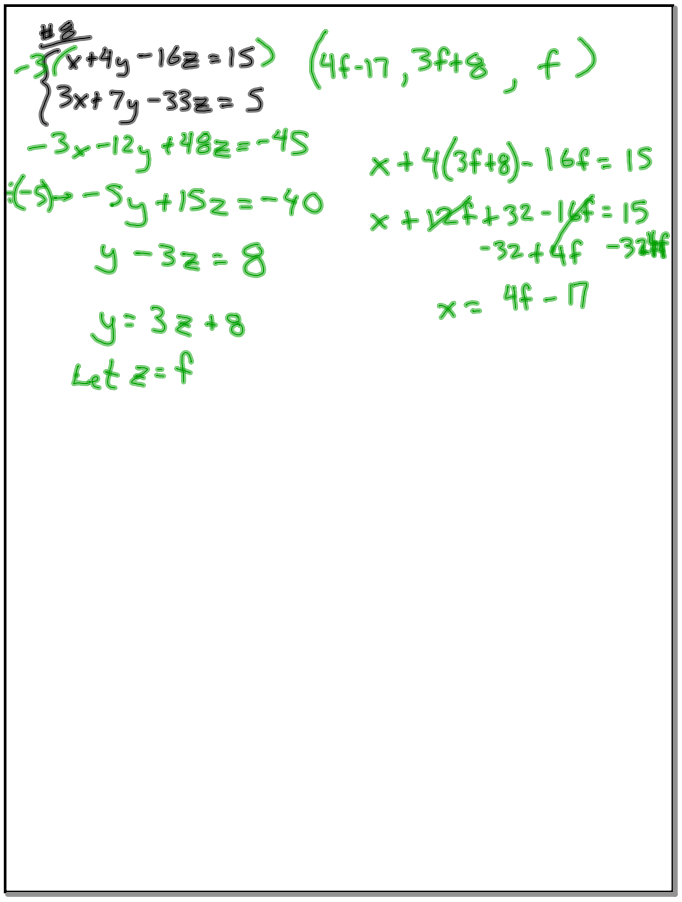
$\frac{c-2}{3}=\frac{3a}{3}$

$a=\frac{c}{3}-\frac{2}{3}$

$2\left(\frac{c}{3}-\frac{2}{3}\right)+19$

$\frac{2c}{3}-\frac{4}{3}+\frac{57}{3}$

$\frac{2c}{3}+\frac{53}{3}$


#8
-3(x+4y-16z=15)
3x+7y-33z=5
-3x-12y+48z=-45
(-5) -5y+15z=-40
y-3z=8
y=3z+8
Let z=f
(4f-17, 3f+8, f)
x+4(3f+8)-16f=15
x+12f+32-16f=15
-32+4f -32+4f
x=4f-17