3. $\frac{x+2y}{4} = -5$

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

Substitution Method

$\frac{4}{1}\left(\frac{x+2y}{4}\right) = -5\left(\frac{4}{1}\right)$

Step 1

$x + 2y = -20$

$-2y = -2y$

$\boxed{x = -20 - 2y}$

Step 2

$\frac{3(-20-2y)-y}{2} = 1$

$\downarrow$

$\frac{-60-6y-y}{2} = 1$

$\downarrow$

$\frac{-60}{2} - \frac{6y}{2} - \frac{y}{2} = 1$

$\downarrow$

$\frac{-60}{2} - \frac{7y}{2} = 1$

$\downarrow$

$-30 - \frac{7y}{2} = 1$

$+30 \qquad +30$

$-\left(\frac{2}{7}\right)\frac{-7y}{2} = 31\left(-\frac{2}{7}\right)$

$\boxed{y = \frac{-62}{7}}$

Step 3

$x = -20 - 2\left(-\frac{62}{7}\right)$

$\downarrow$

$x = -20 + \frac{124}{7}$

$\downarrow$

$\boxed{x = -\frac{16}{7}}$

Need to Test Solutions

$\boxed{x = -16/7}$ $\boxed{y = -62/7}$

Algebraic Test

$$\frac{x + 2x}{4} = -5$$

$$\downarrow$$

$$\frac{\left(-\frac{16}{7}\right) + 2\left(-\frac{62}{7}\right)}{4} = -5$$

$$\downarrow$$

$$\frac{\left(-\frac{16}{7}\right) + \left(-\frac{124}{7}\right)}{4} = -5$$

$$\downarrow$$

$$\frac{\left(-\frac{140}{7}\right)}{4} = -5$$

$$\downarrow$$

$$-\frac{20}{4} = -5$$

$$\boxed{-5 = -5}$$

We're Good But Need
to check graphically...

Graphical Check

$\frac{y}{1}\left(\frac{x+2y}{y}\right) = -\frac{5}{1}\left(\frac{y}{1}\right)$

$x + 2y = -20$

$-x \qquad = -x$

$\frac{2y}{2} = \frac{-x}{2} - \frac{20}{2}$

$y = \frac{-1x}{2} - 10$

$y = mx + (-b)$

$\frac{x}{1}\left(\frac{3x-y}{x}\right) = \frac{1}{1}\left(\frac{2}{1}\right)$

$3x - y = 2$

$+y \quad +y$

$3x = 2 + y$

$-2 \quad -2$

$3x - 2 = y$

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

$y = mx + (-b)$

Different Slopes at different y-intercepts mark one solution. Consistent and Independent.

One Solution of intersection

$X = -16/7 (-2.29)$

$Y = -62/7 (-8.86)$