Solving Systems of Equations by elimination method

Use elimination to solve. Check your answers (This means to substitute your values back into ***BOTH*** equations).

1. $7c-5d=11$
$-4d-2c=-14$

Careful!

$4(7c-5d=11)$
$-5(-2c-4d=-14)$

$28c-20d=44$
$10c+20d=70$

$\frac{38c}{38}=\frac{114}{38}$

$c=3$

(3,2)

Check into originals!

$7c-5d=11$
$7(3)-5(2)\stackrel{?}{=}11$
$21-10=11$
$11=11$ ✓

subst $7c-5d=11$

$7(3)-5d=11$
$21-5d=11$
$-21\quad -21$
$\frac{-5d}{-5}=\frac{-10}{-5}$
$d=2$

Check BOTH EQs

$-4d-2c=-14$
$-4(2)-2(3)\stackrel{?}{=}-14$
$-8-6=-14$
$-14=-14$ ✓

2. Let's make up numbers for the equations and solve it.
No one said the solutions had to be "nice" numbers!

$-5(x+y=2)$
$5x-\frac{1}{3}y=12$

$-5x-5y=-10$

$-5\frac{1}{3}y=2$

$-\frac{3}{16}\cdot\frac{-16}{3}y=\frac{2}{1}\cdot\frac{-3}{16}$

$y=\frac{-6}{16}\div\frac{2}{2}$

$y=-\frac{3}{8}$

subst into $x+y=2$

$x+\frac{-3}{8}=2$
$+\frac{3}{8}\quad +\frac{3}{8}$
$x=2\frac{3}{8}$

$\left(2\frac{3}{8},-\frac{3}{8}\right)$

Check in BOTH EQ's

$x+y=2$
$2\frac{3}{8}+\left(-\frac{3}{8}\right)\stackrel{?}{=}2$
$2=2$ ✓

$5x-\frac{1}{3}y=12$
$5\left(2\frac{3}{8}\right)-\frac{1}{3}\left(\frac{-3}{8}\right)\stackrel{?}{=}12$
$5\left(\frac{19}{8}\right)+\frac{1}{8}\stackrel{?}{=}12$
$\frac{95}{8}+\frac{1}{8}\stackrel{?}{=}12$
$\frac{96}{8}\stackrel{?}{=}12$
$12=12$ ✓

Solve by elimination.

3. $2x = 3y + 5$
   $6x - 9y = 10$

$-3(2x - 3y = 5)$ $\quad -6x + 9y = -15$
$6x - 9y = 10$ $\quad 6x - 9y = 10$
$0 = -5$

FALSE
SO NO SOLUTION!

Solve by substitution.

4. $x - 3y = 7$
   $y = 2x - 9$

solution $(4, -1)$

$x - 3(2x - 9) = 7$
$x - 6x + 27 = 7$
$-5x + 27 = 7$
$-27 \quad -27$
$\frac{-5x}{-5} = \frac{-20}{-5}$
$x = 4$
$y = 2x - 9$
$= 2(4) - 9 = 8 - 9 = -1$

check
$x - 3y = 7$
$4 - 3(-1) = 7$
$4 + 3 = 7$
$7 = 7 \surd$

$y = 2x - 9$
$-1 = 2(4) - 9$
$-1 = 8 - 9$
$-1 = -1 \surd$

Questions:

What would the graph of #3 look like?
Parallel lines

When is it easiest to use the substitution method? when variable is singled out or isolated

The elimination method? when BOTH EQUATIONS ARE IN STANDARD FORM

Graphing? if both eqs $y =$ with fraction slope and integer y-int (less than 10)