Solving Systems of Equations Algebraically - REVIEW

$X = \#$ $\# = \#$ $\# \neq \#$

How many solutions does each system have? (One Solution, Infinite Solutions, or No Solution)

1)
$$x + 3y = -10$$
$$x - 3y = 10$$
$+$
$$0 = 0 \checkmark$$
Infinite Solutions

2)
$$3x - 8y = 9$$
$$3x + 8y = -3$$
$+$
$$\frac{6x}{6} = \frac{6}{6}$$
$$x = 1$$ **ONE Solution**

3)
$$7x - 6y = 4$$
$$-7x + 6y = -5$$
$+$
$$0 \neq -1$$
NO Solution

Determine if the following is a solution to the system of equations:

4) Solution (1,3) plug in & check!
$$x \quad y$$
System:
$$2x + y = 5 \checkmark$$
$$4x + 2y = 10 \checkmark$$
Yes (1,3) is a solution!

$$2(1) + (3) = 5$$
$$2 + 3 = 5$$
$$5 = 5 \checkmark$$

$$4(1) + 2(3) = 10$$
$$4 + 6 = 10$$
$$10 = 10 \checkmark$$

5) Solution (−1,2)
$$x \quad y$$
System:
$$x + y = -1 \quad X$$
$$2x + 3y = 2$$
No, (-1,2) is not a solution!

$$(-1) + (2) = -1$$
$$1 \neq -1$$
NO

$$2(-1) + 3(2) = 2$$
*Doesn't matter since first one didn't "check".

6) Solution (0,5)
$$x \quad y$$
System:
$$3x + y = 5$$
$$3x - y = 5$$
NO, (0,5) is not a solution!

$$3(0) + (5) = 5$$
$$0 + 5 = 5$$
$$5 = 5 \checkmark$$

$$3(0) - (5) = 5$$
$$0 - 5 = 5$$
$$-5 \neq 5$$
NO

Solve each system of equations algebraically for numbers 7-12

7)
$$y = 5x + 4$$
$$y = 3x - 6$$
Substitution

$$5x + 4 = 3x - 6$$
$$-3x \qquad -3x$$
$$2x + 4 = -6$$
$$-4 \quad -4$$
$$\frac{2x}{2} = \frac{-10}{2}$$
$$x = -5$$

$$y = 5(-5) + 4$$
$$y = -25 + 4$$
$$y = -21$$

Solution (-5, -21)

8)
$$15x + 3y = 15$$
$$3x - 3y = 9$$
SKIP.

Substitution

9) $6x + 9y = 57$
$\boxed{x = 5}$

$6(5) + 9y = 57$
$30 + 9y = 57$
$-30 \qquad -30$
$\dfrac{9y}{9} = \dfrac{27}{9}$
$\boxed{y = 3}$

$(5, 3)$ Solution

10) $4x + 2y = 12$
$-2(2x + 4y = -18)$

$4x + 2y = 12$
$-4x - 8y = 36$
$\overline{\qquad\qquad}$
$\dfrac{-6y}{-6} = \dfrac{48}{-6}$
$\boxed{y = -8}$

$4x + 2(-8) = 12$
$4x - 16 = 12$
$+16 \quad +16$
$\dfrac{4x}{4} = \dfrac{28}{4}$
$\boxed{x = 7}$

Solution $(7, -8)$

11) $3x + 7y = -2$
$\quad\;\, 2x + 3y = -3$

Skip.

12) $4(x - 4y = 3)$
$\quad\; -4x + 2y = 16$

$4x - 16y = 12$
$-4x + 2y = 16$
$\overline{\qquad\qquad}$
$\dfrac{-14y}{-14} = \dfrac{28}{-14}$
$\boxed{y = -2}$

$x - 4(-2) = 3$
$x + 8 = 3$
$-8 \quad -8$
$\boxed{x = -5}$

Solution $(-5, -2)$

13) A jar contains dimes and nickels. The total number of coins in the jar is 15. The total value of the coins is $1.00. How many of each type of coin are in the jar?

Skip... (but if you tried) ⟹

Let $d = $ # dimes
$n = $ # nickels

$n + d = 15$
$-10(.05n + .10d = 1)$ →

10 nickels and 5 dimes

$n + d = 15$
$-.5n - 1d = -10$
$\overline{\qquad\qquad}$
$\dfrac{.5n}{.5} = \dfrac{5}{.5}$
$15 - 10 = 5 \quad \boxed{n = 10}$

14) Mia bought 7 shirts for a total of $95. Her long-sleeved shirts cost $25 each and her tank tops cost $9 each. How many of each type of shirt did she buy?

Let $x = $ long sleeve
$y = $ tank tops

$-9(x + y = 7)$ →
$25x + 9y = 95$

$-9x - 9y = -63$
$25x + 9y = 95$
$\overline{\qquad\qquad}$
$\dfrac{16x}{16} = \dfrac{32}{16}$
$\boxed{x = 2}$

2 long sleeved shirts and 7 tank tops ☺