Name: **Key**   Block:_____ Date:_____

Systems of Equations Word Problems

For each system of equations, define your variables, write a system of equations, and solve. Make sure to interpret your results (ex: there were 7 student tickets sold and 12 adult tickets sold, etc.). You may solve using graphing, substitution, or elimination. Show appropriate work. You may attach graph paper for your graphs if necessary.

1. A used book store also started selling used CDs and videos. In the first week, the store sold a combination of 40 CDs and videos. They charged $4 per CD and $6 per video and the total sales were $180. Determine the total number of CDs and videos sold.

$x = CD's$ $y = videos$

$x + y = 40$ $y = 40 - x$

$4x + 6y = 180$

$4x + 6(40 - x) = 180$
$4x + 240 - 6x = 180$
$-2x = -60$
$\boxed{x = 30}$ ✓
$\boxed{y = 10}$

2. At the end of the 2000-2001 football season, 31 Super Bowl games had been played with the current two football leagues, the American Football Conference (AFC) and the National Football Conference (NFC). The NFC won five more games than the AFC. Determine the total number of wins by each conference.

$x = AFC$ $y = NFC$

$x + y = 31 \to y = 31 - x$
$y = x + 5$

$x + 5 = 31 - x$
$2x = 26$
$\boxed{x = 13}$ ✓
$\boxed{y = 18}$

3. The length of Sally's garden is 4 meters greater than 3 times the width. The perimeter of her garden is 72 meters. Find the dimensions of Sally's garden. $L = length$ $w = width$

$L = 3w + 4$

$2L + 2w = 72$

$2(3w + 4) + 2w = 72$
$6w + 8 + 2w = 72$
$8w = 64$
$\boxed{w = 8 \quad L = 28}$ ✓

4. Two times a number added to another number is 25. Three times the first number minus the other number is 20. Find the two numbers. $x = 1st \#$ $y = 2nd \#$

$2x + y = 25 \to y = 25 - 2x$
$3x - y = 20$

$3x - (25 - 2x) = 20$
$3x - 25 + 2x = 20$
$5x = 45$
$\boxed{x = 9 \quad y = 7}$ ✓

5. At a sale on winter clothing, Cody bought two pairs of gloves and four hats for $43.00. Tori bought two pairs of gloves and two hats for $30.00. Find the prices of the hats and gloves.

$x = gloves$ $y = hats$

$2x + 4y = 43$
$-(2x + 2y = 30)$
_____
$2y = 13$
$\boxed{y = 6.50 \quad x = 8.50}$ ✓

6. A chemistry lab needs to make 100 gallons of an 18% acid solution by mixing a 12% acid solution with a 20% solution. Find the number of gallons needed of each solution. ✳ make the table if needed.

$X = 12\%$ solution $y = 20\%$ solution

$X + y = 100 \rightarrow y = 100 - x$
$.12x + .20y = 18$

$.12x + .20(100 - x) = 18$
$.12x + 20 - .2x = 18$
$-.08x = -2$
$\boxed{X = 25 \quad y = 75}$ ✓

7. Anita is $4\frac{1}{2}$ years older than Basilio. Three times Anita's age added to six times Basilio's age is 36. Find the age of each person.

$A = $ Anita's Age $B = $ Basilio's Age

$A = B + 4.5$
$3A + 6B = 36$

$3(B + 4.5) + 6B = 36$
$3B + 13.5 + 6B = 36$
$9B = 22.5$
$\boxed{B = 2.5 \quad A = 7}$ ✓

8. You have $4.75 in quarters and dimes. If you double the number of dimes, you will have 5 more dimes than quarters. How many dimes do you have?

$X = $ Quarters $y = $ dimes

$.25x + .10y = 4.75$

$2y = X + 5 \rightarrow X = 2y - 5$

$.25(2y - 5) + .10y = 4.75$
$.5y - 1.25 + .10y = 4.75$
$.6y = 6$
$\boxed{y = 10 \quad X = 15}$ ✓

9. Laura and Brent paddled a canoe 6 miles upstream in four hours. The return trip took three hours. Find the rate of the current and the rate at which Laura and Brent paddled the canoe in still water.

$d = rt$
$\frac{d}{t} = r$

$X = $ still water paddling $y = $ current

Upstream 6 miles 4 hours.
downstream 6 miles 3 hours

down→ $X + y = 2$
up→ $X - y = 1.5$

$X + y = 2$
$-X + y = -1.5$
$2y = .5$ $\boxed{y = .25 \quad X = 1.75}$ ✓

10. Tickets to a movie cost $7.25 for adults and $5.50 for students. A group of friends purchased 8 tickets for $52.75. Determine the total number of adult and student tickets.

$X = $ adult $y = $ students

$7.25X + 5.50y = 52.75$

$X + y = 8 \rightarrow y = 8 - x$

$7.25x + 5.5(8 - x) = 52.75$
$7.25x + 44 - 5.5x = 52.75$
$1.75x = 8.75$
$\boxed{X = 5}$ ✓
$\boxed{Y = 3}$ ✓