Key

# Systems of Linear Equations – Word Problems

4-Step Method:

1. Define variables
2. Write the system of equations
3. Solve showing all steps
4. State your solution in sentence form

1. You sell tickets for admission to your school play and collect a total of $104. Admission prices are $6 for adults and $4 for children. You sold 21 tickets. How many adult tickets and how many children tickets did you sell?

x = adults
y = children

$-4(x + y = 21)$

$6x + 4y = 104$

$-4x - 4y = -84$

$2x = 20 \quad x = 10$

$x + y = 21$

$10 + y = 21$

$y = 11$

check $10 + 11 = 21$ ✓

10 adult tickets // 11 child tickets

2. Your family goes to a restaurant for dinner. There are 6 people in your family. Some order the chicken dinner for $14.80 and some order the steak dinner for $17. If the total bill was $91, how many people ordered each type of dinner?

$-17(x + y = 6)$

$14.8x + 17y = 91$

$-17x - 17y = -102$

$\frac{-2.2x}{-2.2} = \frac{-11}{-2.2} \quad x = 5$

x = chicken

y = steak

$x + y = 6$

$5 + y = 6$

$y = 1$

5 chicken
1 steak

3. You bought the meat for Saturday's cookout. A package of hot dogs cost $1.60 and a package of hamburger cost $5. You bought a total of 8 packages of meat and you spent $23. How many packages of hamburger meat did you buy?

x = hot dog

y = hamburger

$-5(x + y = 8)$

$1.6x + 5y = 23$

$-5x - 5y = -40$

$-3.4x = -17 \quad x = 5$

$x + y = 8$

$5 + y = 8$

$y = 3$

5 hot dog
3 hamburger

24

4. Casey orders 3 pizzas and 2 orders of breadsticks for a total of $29.50. Rachel orders 2 pizzas and 3 orders of breadsticks for a total of $23. How much does a pizza cost?

x = pizza cost
y = breadstick cost

pizza costs $8.50
Breadsticks cost $2

$-2(3x+2y=29.50)$
$3(2x+3y=23.00)$

$-6x-4y=-59$
$6x+9y=69$

$\frac{5y}{5}=\frac{10}{5}$ $y=2$

$3x+2y=29.50$
$3x+2(2)=29.50$
$3x+4=29.50$
$-4 \quad -4.00$

$\frac{3x}{3}=\frac{25.50}{3}$ $x=8.5$

5. Rent-A-Car rents compact cars for a fixed amount per day plus a fixed amount for each mile driven. Benito rented a car for 6 days, drove it 550 miles, and spent $337. Lisa rented the same car for 3 days, drove it 350 miles, and spend $185. What is the charge per day and the charge per mile for the compact car?

x = cost per day $
y = mile $ (cost per)

$6x+550y=337$
$-2(3x+350y=185)$ → $6x+550y=337$, $-6x-700y=-370$

$6x+550(.22)=337$
$6x+121=337$
$-121 \quad -121$
$\frac{6x}{6}=\frac{216}{6}$

$x=\$36$ per day

$\frac{-150y}{-150}=\frac{-33}{-150}$

$y=\$0.22$ per mile

6. Beach Hotel in Cancun is offering two weekend specials. One includes a 2-night stay with 3 meals and cost $195. The other includes a 3-night stay with 5 meals and cost $300. What is the cost of a single meal?

x = cost of stay
y = cost of meal

$-3(2x+3y=195)$
$2(3x+5y=300)$ → $-6x-9y=-585$, $6x+10y=600$

$y=\$15$ per meal

$2x+3(15)=195$
$2x+45=195$
$-45 \quad -45$
$\frac{2x}{2}=\frac{150}{2}$
$x=\$25$

$25 per night