

MODELLING PROBLEMS USING LINEAR SYSTEMS

Given the information provided in the following problems, model each in mathematical form as a system of linear equations. You **DO NOT** need to solve the system to find a solution.

Modelling Method:

1. Declare your variables.
2. Create your equations.

1. The sum of two numbers is 24. The product of the same two numbers is 143. Find the two numbers.

Let x represent the first #

Let y represent the second #

Equation ① $x + y = 24$

Equation ② $xy = 143$

2. SPSS Student Council held a raffle and sold 480 tickets. Students were charged \$2 per ticket and teachers \$5 per ticket. Total ticket sales were \$1560. Determine the number of teachers and the number of students who bought tickets.

Let t represent the # of teacher tickets sold

Let s represent the # of student tickets sold

Equation ① $t + s = 480$

Equation ② $5t + 2s = 1560$



3. In a hockey arena, rink level seats cost three times as much as seats in the upper level. If five seats at rink level cost \$112 more than eight seats in the upper level, find the cost of a seat at rink level.

Let r represent the cost of a seat at rink level

Let u represent the cost of a seat in the upper level

Equation ① $r = 3u$

Equation ② $5r = 8u + 112$



4. Jared has \$3.85 in dimes and quarters. There are 25 coins in all. How many of each type of coin does he have?

Let d represent the # of dimes

Let q represent the # of quarters

Equation ① $0.10d + 0.25q = 3.85$

Equation ② $d + q = 25$



Read the following word problems carefully. For each problem, provide a mathematical model to represent the scenario by writing two 'Let' statements and a system of linear equations.

NOTE: You **DO NOT** need to solve the problem.

1. The sum of two numbers is 13. The product of the same two numbers is 40. Find the two numbers.

Let x be the first #
Let y be the second #

$$x + y = 13$$

$$xy = 40$$

2. The total cost of concert tickets for 2 adults and 4 students is \$120. If student tickets are \$15 each, determine the price of an adult ticket.

Let a be the price of an adult ticket
Let s be the Price of a student ticket

$$2a + 4s = 120$$

$$s = 15$$

3. Yamir weighs 30 kilograms more than twice his younger brother's weight. If the sum of their weights is 120 kilograms, how much does each brother weigh?

Let y be Yamir's weight
Let b be his brother's weight

$$y = 2b + 30$$

$$y + b = 120$$

4. There are twice as many quarters in a jar as there are nickels. The total value of the coins is \$2.20. How many of each coin are in the jar?

Let n be the # of nickels
Let q be the # of quarters

$$q = 2n$$

$$0.05n + 0.25q = 2.20$$

5. Three times as many robins as cardinals visited a bird feeder. If a total of 20 robins and cardinals visited the feeder, how many robins were there?

Let r be the # of robins
Let c be the # of cardinals

$$r = 3c$$

$$r + c = 20$$