

Chicken-and-Rabbit Problems

EXAMPLES

- 1 A farmer has 80 chickens and rabbits. There are a total of 250 legs. How many chickens are there? How many rabbits are there?

Solution:

Method 1: Make a Table

No. of chickens	No. of legs	No. of rabbits	No. of legs	Total no. of legs
40	80	40	160	240
35	70	45	180	250

How to make that second guess?

$$250 - 240 = 10 \quad [\text{difference of the total number of legs}]$$

$$4 - 2 = 2 \quad [\text{difference of legs between a chicken and a rabbit}]$$

$$10 \div 2 = 5 \quad [5 \text{ more chickens to } 1^{\text{st}} \text{ guess}]$$

$$40 + 5 = 45 \quad [\text{total number of rabbits}]$$

Method 2: Solve by Assuming

Assume all were chickens,

$$80 \times 2 = 160$$

$$250 - 160 = 90$$

there would be a shortage of 90 legs.

The rabbits were counted as chickens.

$$4 - 2 = 2$$

$$90 \div 2 = 45 \text{ rabbits}$$

$$80 - 45 = 35 \text{ chickens}$$

There are **45** rabbits and **35** chickens.

- 2 There are 36 cars and motorcycles in a car park. There are 122 wheels altogether. How many cars are there? How many motorcycles are there?

Solution: Method 1: Make a Table

No. of cars	No. of wheels	No. of motorcycles	No. of wheels	Total no. of wheels
18	72	18	36	108
25	100	11	22	122

How to make that second guess?

$$122 - 108 = 14 \quad [\text{number of wheels short}]$$

$$4 - 2 = 2 \quad [\text{difference of wheels between a car and a motorcycle}]$$

$$14 \div 2 = 7 \quad [7 \text{ more cars to 1}^{\text{st}} \text{ guess}]$$

$$18 + 7 = 25$$

Method 2: Solve by Assuming

$$\text{If all were cars, } 36 \times 4 = 144$$

$$144 - 122 = 22$$

there would be a shortage of 22 wheels.

$$4 - 2 = 2$$

$$22 \div 2 = 11 \text{ motorcycles}$$

$$36 - 11 = 25 \text{ cars}$$

There are **25** cars and **11** motorcycles.

- 3 Mary has 40 fifty-cent and twenty-cent coins. The total amount she has is \$11. How many twenty-cent coins does Mary have? How many fifty-cent coins does Mary have?

Solution: Method 1: Make a Table

No. of 50¢ coins	Value	No. of 20¢ coins	Value	Total value
20	1000¢	20	400¢	1400¢
10	500¢	30	600¢	1100¢

Making the second guess

$$1400¢ - 1100¢ = 300¢$$

$$50¢ - 20¢ = 30¢$$

$$300¢ \div 30¢ = 10 \text{ more twenty-cent coins}$$

$$20 + 10 = 30 \text{ twenty-cent coins}$$

Method 2: Solve by Assuming

$$\text{If all were fifty-cent coins, } 40 \times 50¢ = 2000¢ = \$20$$

$$\$20 - \$11 = \$9 \text{ or } 900¢ \text{ short}$$

there would be a shortage of 900 cents.

$$50¢ - 20¢ = 30¢$$

$$900¢ \div 30¢ = 30 \text{ twenty-cent coins}$$

$$40 - 30 = 10 \text{ fifty-cent coins}$$

There are **10** fifty-cent coins and **30** twenty-cent coins.

- 4 A school bought 11 volleyballs and basketballs for \$445. A basketball cost \$45. A volleyball cost \$35. How many basketballs were there? How many volleyballs were there?

Solution:

Method 1: Make a Table

No. of basketballs	Cost	No. of volleyballs	Cost	Total cost
5	\$225	6	\$210	\$435
6	\$270	5	\$175	\$445

Making the second guess

$$\$445 - \$435 = \$10$$

$$\$45 - \$35 = \$10$$

$$\$10 \div \$10 = 1$$

$$5 + 1 = 6 \text{ basketballs}$$

Method 2: Solve by Assuming

If all were basketballs,

$$11 \times \$45 = \$495$$

$$\$495 - \$445 = \$50$$

there would be a shortage of \$50.

$$\$45 - \$35 = \$10$$

$$\$50 \div \$10 = 5 \text{ volleyballs}$$

$$11 - 5 = 6 \text{ basketballs}$$

There were **6** basketballs and **5** volleyballs.

- 5 There are 20 questions in a mathematics quiz. For each correct answer, 5 marks will be given. 2 marks will be deducted for a wrong answer. How many questions does Andy answer wrongly if he scores 72 marks for that mathematics quiz?

Solution:

If all questions were answered correctly,

$$20 \times 5 = 100$$

Andy would have scored 100 marks.

$$100 - 72 = 28$$

Andy loses 28 marks in the mathematics quiz.

$$5 + 2 = 7$$

Each wrong answer will take away 7 marks.

$$28 \div 7 = 4$$

Andy answers **4** questions wrongly if he scores 72 marks for that mathematics quiz.

PRACTICE



- 1 A comic book costs \$4. A science magazine costs \$2. A teacher pays \$28 in all for 10 comic books and science magazines.
How many comic books does he buy?
How many science magazines does he buy?

Method 1: Make a Table

No. of comic books	Cost	No. of science magazines	Cost	Total cost

Method 2: Solve by Assuming

- 2 A farmer has 40 chickens and rabbits. There are 112 legs.
How many chickens are there?
How many rabbits are there?

Method 1: Make a Table

No. of chickens	No. of legs	No. of rabbits	No. of legs	Total no. of legs

Method 2: Solve by Assuming

- 3** A farmer has 60 chickens and rabbits. There are 200 legs.
How many chickens are there?
How many rabbits are there?

Method 1: Make a Table

No. of chickens	No. of legs	No. of rabbits	No. of legs	Total no. of legs

Method 2: Solve by Assuming

- 4** There are 40 tricycles and bicycles in a park. There are 106 wheels.
How many tricycles are in the park?
How many bicycles are in the park?

Method 1: Make a Table

No. of tricycles	No. of wheels	No. of bicycles	No. of wheels	Total no. of wheels

Method 2: Solve by Assuming

- 5** A spider has 8 legs.
A dragonfly has 6 legs.
18 spiders and dragonflies have 128 legs.
How many spiders are there?
How many dragonflies are there?

Method 1: Make a Table

No. of spiders	No. of legs	No. of dragonflies	No. of legs	Total no. of legs

Method 2: Solve by Assuming

- 6** There are 24 cars and motorcycles parked in a car park. There are 80 wheels altogether.
How many cars are there?
How many motorcycles are there?

Method 1: Make a Table

No. of cars	No. of wheels	No. of motorcycles	No. of wheels	Total no. of wheels

Method 2: Solve by Assuming

- 7 Dorothy has 50 fifty-cent and one-dollar coins in her piggy-bank. The total amount of money in the piggy-bank is \$35.
How many one-dollar coins are there?
How many fifty-cent coins are there?

Method 1: Make a Table

No. of one-dollar coins	Value	No. of fifty-cent coins	Value	Total value

Method 2: Solve by Assuming

- 8 40 litres of fruit juice is to be bottled in 30 two-litre and one-litre bottles.
How many two-litre bottles are needed?

- 9** An adult movie ticket costs \$7. A concession ticket costs \$4. Patsy pays \$63 in all for 12 tickets.
How many adult tickets does she pay for?
- 10** A school bought 12 volleyballs and basketballs for \$340. Each basketball cost \$30. Each volleyball cost \$25.
How many basketballs did the school buy?

- 11** There were 50 questions in a science test. 3 marks were given for each correct answer. 2 marks were deducted for each wrong answer. Andrew scored 125 marks for the science test.

How many questions did he answer correctly in the science test?

- 12** There were 20 questions in a maths quiz. 5 marks were awarded for a correct answer. 2 marks were deducted for a wrong answer.

How many questions did Kathy answer correctly if she got 79 marks in the maths quiz?