CHAPTER

7

Mixed Operations

Vocabulary:

multi-step problems
unequal sharing

Chapter Outcomes:

- Solve problems using whole numbers involving the four operations.
- Solve problems involving unequal sharing.

Problems are a part of life. So it's important to know how to solve them. You do not magically become a good problem solver simply by reaching adulthood. Even the maxi taxi driver began learning how to solve problems as a child and practiced problem solving every day from childhood to adulthood. Knowing how to combine skills in addition, subtraction, multiplication and division helps him in solving problems as he transports persons from place to place.

Multi-Step Problems

Teaching Point 1:

How can I solve a multi-step problem?

Miss Thomas has 108 pencils and 72 erasers to share equally among her 9 grandchildren. How many more pencils than erasers will each child receive?

Read

What do I need to find?

I need to find the number of pencils that are **more than** erasers which each child will get.

What information am I given?

There are **108 pencils** and **72 erasers**.

9 children must **share** the pencils and erasers **equally**.

Plan

What is my plan?

I can draw a **bar model** for each step and write each number sentence.

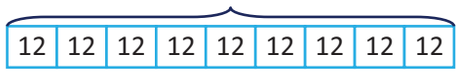
Then I can **divide** to find the number of pencils and erasers each child gets and **subtract** to find how many more pencils than erasers each child will get.

Solve

I can draw bar models and write number sentences to find out how many pencils and erasers each child gets.

Step 1: Find how many pencils each child gets.

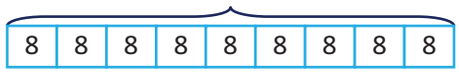
108



108 ÷ 9 = 12 pencils

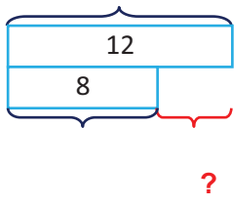
Step 2: Find how many erasers each child gets.

72



72 ÷ 9 = 8 erasers

Step 3: Find how many more pencils than erasers each child gets.



12 – 8 = 4

Each child will get 4 more pencils than erasers.

Check

How can I check my answer?

I can do the inverse operations.

8 + 4 = 12

12 × 9 = 108 and 8 × 9 = 72

If the results are **108** and **72**, the answer is correct.

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Activity 1:

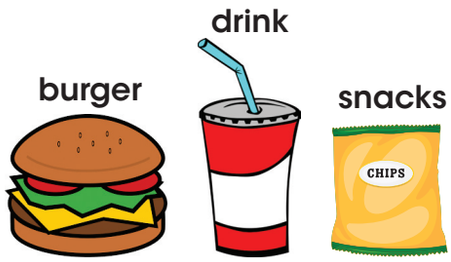
Solve the problems below.

1. A cinema has 25 seats in each row. When the cinema is full, it holds 475 persons. If there are 7 empty rows of seats in the cinema, how many persons are there in the cinema?
2. There are 256 boys and 248 girls at the National Primary School Sports. Each student participates in one event. Each event has 24 students participating. How many events are there?
3. Mr. Jack has 14 boxes with 125 apples in each box. He packs the apples into bags of 5 and sells each bag for $10. How much money will he collect after selling all the apples?
4. There are 267 houses in Marisa's community. She collected $355 from her neighbours as donations for her school's bazaar. If she collected $5 at each house, from how many houses Marisa did not collect donations?
5. Marcus earns $655 each week. He spends $275 and saves the rest. How much money will he have saved after 8 weeks?
6. Alex, Alina and Aaron played darts at the school bazaar. Aaron's score is shown in the table below.

Children	Points
Alex	
Alina	
Aaron	23

The total number of points scored by the three children is 96. Alina points is twice Aaron's score. How many points did Alex score?

7. Javan received $100 as a gift. He plans to buy two packs of wrist bands that cost $15 per pack and a headphone set that costs $59. How much money will he have left?
8. Ricardo is 13 years old. His father takes him and his two younger sisters to a cricket match. Tickets are $265 for adults and $155 for children (12 years and under). What was the total cost of their tickets?
9. A cafeteria sells burgers, drinks and snacks at the prices listed below.



If Melissa orders a burger, a drink and two snacks, what will be her change from a $50 bill?

10. Joe scored 3 489 points in the first round of a computer game. He scored 3 415 more points in the second round than he did in the first round. How many points did Joe score in the two rounds?
11. The scout troop is raising $1 500 for their holiday camp. So far they have earned $365 from a car wash and $25 donations each from 15 persons. How much more money do they have to earn to reach their goal?

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Problem Solving: Unitary Method

Teaching Point 1:

How can I use the unitary method to solve problems?

If 5 apples cost $30, how much will 8 apples cost?

Read

What do I need to find?

I need to find the cost of 8 apples.

What information am I given?

5 apples cost **$30**.

Plan

What is my plan?

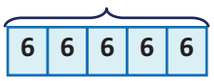
I can draw a **bar model** to show how much 1 apple cost.

Then I can write a number sentence to find out how much 8 apples will cost.

Solve

I can draw a bar model and write number sentences to find out how much 8 apples cost.

$30



5 apples → **$30**

1 apple → **$30 ÷ 5 = $6** ← Divide

8 apples → **$6 × 8 = $48** ← Multiply

So, 8 apples will cost $48.

Check

How can I check my answer?

I can do the inverse operations.

48 ÷ 8 = 6

6 × 5 = 30

If the result is **30**, the answer is correct.

Activity 1:

Solve the problems.

1. The cost of 5 kg of flour is $25. What will be the cost of 25 kg of flour?
2. A mason gets $684 for 9 days of work. How many days should he work to get $912?
3. Shelly bought a dozen pens for $144.
   (a) Find the cost of 15 such pens.
   (b) How many pens can be bought for $84?
4. The weight of 6 books is 12 kg. What is the weight of 20 such books?
5. Four equal sized boxes contain a maximum of 80 books. How many books will fit in 10 boxes?
6. There are 12 eggs in a carton and 12 cartons in a box. How many eggs are in 8 boxes?
7. If ◇ represents 6 items, and the cost of ◇◇◇◇ is $72, what is the total cost of ◇◇◇◇◇◇?
8. If 15 buses can carry 795 passengers, what is the total number of passengers that can be carried by 18 buses?

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9. Twenty tiles weigh 5 kg.

(a) How much will 7 of the same tiles weigh?

(b) If a man wants to carry no more than 12 kg, how many of the same tiles can there be in one load?

Unequal Sharing

Teaching Point 1:

*How can I solve an **unequal sharing** problem?*

Jamal, Alex and Arun altogether have 22 marbles. Jamal has 3 more than Alex and Arun has 4 more than Jamal. How many marbles do each of them have?

Read

What do I need to find?

I need to find the number of marbles each boy has.

What information am I given?

Three boys have **22 marbles** altogether.

Jamal has **3 more** marbles than Alex.

Arun has **4 more** marbles than Jamal.

Plan

What is my plan?

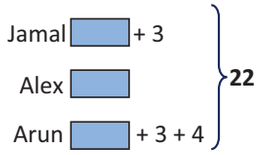
I can draw a **bar model** to show how many marbles each boy has.

Then I can write the number sentences to find out how many marbles each boy has.

Solve

I can draw a bar model and write number sentences to find out how many marbles each boy has.

First, draw a bar model to show how the marbles are shared.



Add the extra marbles that Jamal and Arun have.

3 + 3 + 4 = 10

Subtract the extra marbles from the total number of marbles.

22 – 10 = 12

Divide the marbles that remain equally.

12 ÷ 3 = 4

Jamal has 4 + 3 = 7 marbles.

Alex has 4 marbles.

Arun has 4 + 3 + 4 = 11 marbles.

Check

How can I check my answer?

I can add the marbles that each boy got.

7 + 4 + 11 = 22

If the result is **22**, the answer is correct.

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Activity 1:

Solve the problems.

1. Alisha has 9 fewer sweets than Jenna. They have 35 sweets altogether. How many sweets does Alisha have?

2. Garvin and Thomas shared 35 mangoes between themselves so that Garvin received 5 more than Thomas. Find each boy's share.

3. A string 120 cm long is cut into two pieces. One piece is 20 cm shorter than the other piece. Calculate the length of each piece of string.

4. Joshua and Josiah are playing marbles, they have 42 marbles altogether. At the end of the game Joshua has 8 marbles fewer than Josiah. How many marbles does Joshua have now?

5. Mommy is 28 years older than her son, Anthony. She is 4 years younger than daddy. The total age of the three of them is 84 years. What is Mommy's age?

6. Jervon, Marissa and Kareena altogether sold 146 tickets for the Barbecue. Jervon sold 14 more tickets than Marissa and Kareena sold 10 more tickets than Jervon. How many tickets did Marissa sell?

7. In a school with 459 students the number of boys is twice the number of girls. How many girls are there in the school?

8. Valley Primary School's football team played a total of 24 games. They won 6 more games than they lost and tied 2 games. How many games did they win?

9. Penny has 41 counters that are either red, yellow or blue in colour. If there are 8 more red than yellow counters and the same number of blue and yellow counters, how many counters are red?

10. Ameera, Maria and David have a combined weight of 63 kilograms. David weighs 8 more kilograms than Maria and Ameera weighs 2 more kilograms than David. How much does each child weigh?

11. A notebook costs $5 more than a folder. Greg purchased 3 notebooks and 2 folders and paid a total cost $30. What is the cost of each item?

12. Kate, Cindy, Sarah and Hema shared some cookies among themselves. Kate got twice as much cookies as Cindy. Sarah got 4 more than Kate but Hema got three fewer than Cindy. If the smallest share was 12, find the total number of cookies shared.

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13. Andell is 9 years older than Arnez. Arnez is 3 years younger than Arianne. The sum of their ages is 24 years. What is the age of each child?

14. A book and a pen together cost $24. If the book costs 11 times as much as the pen, find the cost of the pen.

Chapter Review

Solve the problems below.

1. A cafeteria sells 6 times as many bottles of water as bottles of juice. If the cafeteria sells 750 bottles of water, how many bottles of juice did the cafeteria sell?

2. Ming ran 5 more laps around the track than Jim.

   (a) If they both ran 15 laps around the track how many laps did Jim run?

   (b) If the distance around the track is 400 metres, what is the total distance they both ran?

3. Maya saved $456 one month, $374 the second month, and some more money during the third month. Altogether Maya saved $1 245 during those three month. How much money did Maya save during the third month?

4. Last week James spent $247 of his savings on a video game. Today, he put $562 into his savings account. He now has $951 in the account. How much money did he have in the account before he bought the video game?

5. Kathy uses 2 slices of bread to make a sandwich. She has 32 slices of bread and 48 pieces of cheese. She will use 4 pieces of cheese in each sandwich.

   (a) How many cheese sandwiches can she make?

   (b) Kathy makes tuna sandwiches with the slices of bread that remains and sells them for $8 each. How much money does she get?

6. Rishi and Avinash are combining their money to buy game tokens. Rishi has $57 and Avinash has $48. Each game token costs $8.

   (a) How many tokens can they buy?

   (b) How much more money will they need to purchase another token?

7. If the sum of two numbers is 56 and their difference is 8, what are the numbers?

8. Four small maxi taxis can hold a maximum of 48 passengers. How many passengers can 14 small maxi taxis take to the beach?

9. A farmer harvested 630 heads of lettuce. The heads of lettuce are packaged in crates that each hold 24.

   (a) How many full crates of lettuce will the farmer get?

   (b) How many more heads of lettuce are needed to fill the last crate?

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10. There are 10 hops in a bag. How many bags of hops will be needed to feed 64 persons if each person has 2 hops?

11. Timothy and Ali had 36 marbles altogether. Timothy loses 8 marbles to Ali during a game. Now Ali has 4 more marbles than Timothy. How many marbles did Ali have before the game?

12. Farmer Lee harvests 90 kilograms of cucumbers and 120 kilograms of tomatoes from his garden. He makes 15 packages of equal weight with both tomatoes and cucumbers.

    (a) What will be the weight of each package?

    (b) How many more kilograms of tomatoes than cucumbers will be in each package?

13. Three containers A, B and C weigh a total of 300 kg. Container A weighs 40 kg more than B and container C weighs 10 kg more than A. Calculate the weight of container B.

14. Maraj's Bakery uses 220 kg of sugar to make 1,000 cakes. Each cake contains the same amount of sugar. How many kilograms of sugar does the bakery need if they bake only 150 cakes?

15. Eight identical shirts cost $64. How much will 12 shirts cost?

16. Jason and Mark went fishing. Jason's fish was 3 times the weight of Mark's fish. If the combined weight of both fishes was 104 kilograms, how much did Jason's fish weigh?

17. Daniel lost 11 of his marbles. His mother gave him the same number of marbles as the number of marbles that he had left. He packs all the marbles equally in 8 bags. Each bag has 13 marbles. How many marbles did Daniel have at first?

18. A school hall has 15 rows of chairs. Each row has the same number of chairs.

    (a) If there are 165 chairs in the hall, how many chairs are in each row?

    (b) The school has 385 children and wants to have enough chairs in the hall for each child. How many more rows of chairs must be added to the chairs in the hall?

19. A bakery bakes 984 cookies and packs them in boxes of 12 for sale. If 37 of the cookies were broken, what is the least number of boxes the bakery can pack with the remaining cookies?

20. A farmer has 144 tomato seedlings. She planted 3 rows of 16 seedlings each and 4 rows of 14 seedlings each. How many seedlings does she have left to plant?

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