

35

Solving problems with addition, subtraction, multiplication and division

We are learning to solve problems with a combination of addition, subtraction, multiplication and division using an efficient strategy.



Play money (Material Master 4-9), number lines (Material Master 5-12), place value materials, a calculator.

Examples Millee's and Sam's families went on a boat ride. There were seven children and eight adults. How much more in total did the adults' rides cost than the children's?



Step 1 What do you need to work out?

I need to work out the difference in cost between the adults and the children.



Step 2 What calculation do you need to do?



I need to work out the cost of the children and the cost of the adults and then subtract them

The children cost $7 \times \$6 = \42

The adults cost $8 \times \$12$.
 $8 \times 12 = (8 \times 10) + (8 \times 2)$
 $= 80 + 16$
 $= \$96$

The adults paid $\$96 - \42 more than the children.

$$\begin{aligned} 96 - 42 &= 96 - 40 - 2 \\ &= 56 - 2 \\ &= \$54 \end{aligned}$$

Step 3 Have you answered the question?

The adults cost \$54 more than the children.

Always work out the answer mentally using your knowledge to help.



Activity



Try to find the answer mentally using your knowledge and basic facts first.



**Find the answer using an efficient strategy.
Record your thinking.**

- 1 Millee had knitted 91 rows of a scarf. Bentley unwound 19 rows. If the remaining scarf had 8 equal-sized stripes, how many rows was each stripe?



- 2 Four kangaroos wanted to reach a pond that was 80 m away. Skippy the baby jumped in 2 m jumps. His brother Leaper jumped in 3 m jumps for the first 30 m then in 2 m jumps. His mother Sweetie jumped in 5 m jumps for the first 60 m then in 4 m jumps. His father Zip jumped in 8 m jumps for the first 40 m then in 6 m jumps.

How many jumps would each kangaroo make to reach the pond?

- 3 Mere was helping her kuia prepare flax as they wove kete. The table shows the number of flax leaves they prepared every hour as they wove kete.



9 – 10 a.m.	10 – 11 a.m.	11 – 12 noon	1 – 2 p.m.	2 – 3 p.m.
1004	1096	988	1352	1256

- a How many flax leaves did they prepare in total?
b How many more leaves did they prepare in the morning than in the afternoon?
- 4 Tepi and his brother Tama were making new fly sheets for their tents. Tepi bought 8 metres of nylon at \$9 per metre. Tama bought 9 metres of polyester at \$11 per metre. How much did this cost altogether?



5 Challenge



Make up a number story that would need at least two different calculations to work out the answer. Give it to a classmate to solve.



6 a Find the answers to these using the most efficient strategy you can.

i $4586 + 3942 + 6214$

ii $14\,352 - 3898 + 43$

iii $\boxed{?} - 3589 = 6435$

iv $5000 \times 70\,000 + 3459$

v $2362 \times 7 - 436$

vi $256 \times 12 + 4$

vii $23\,456 - 12\,097 + 7655$

viii $135 \div 5 + 38$

ix $288 \div 9 - 23$

x $3469 + \boxed{?} - 546 = 5218$

Record the strategy you used.



b Choose two of the problems you solved and explain to a partner why you chose the strategy you did.

Discuss with your partner if this was the most efficient strategy to use and why or why not.

Write down your thinking.

7 “Petey’s Cleaning Company” cleans windows in office blocks.

a Petey cleaned an office block with 72 windows.

He wanted to divide the windows into equal-sized groups.

Write down all the different numbers of windows he could have in each group.

b Petey worked out that he had cleaned 2378 windows last year and 50×109 windows this year.

How many windows is this altogether?



8 The 2006 census asked how many cars each New Zealand household had. The results were:

None	One car	Two cars	Three or more cars
112 758	527 847	531 627	222 204

a How many households had more than one car?

b How many more households had one or more cars than no cars?



9 Challenge



Using the information in the table in question 8, make up a question that requires more than one calculation to solve it. Give it to a classmate to solve.

Trip to the rugby



Find the answers to these using an efficient strategy.
Always try to find the answer mentally first using your knowledge of basic facts.
Show your thinking.

- 1 On their way to the inter-school rugby, Sam's class bought lunch at Beachside Café.



- a Millee and her seven friends each bought a filled roll, fresh fruit and flavoured milk.
How much did they pay in total?
- b Sam and his eight friends each bought an orange juice, pasta bake and flavoured milk.
How much more or less did Sam and his friends pay than Millee and hers?

2 Challenge

Points in rugby


try = 5 points conversion = 2 points penalty goal = 3 points drop goal = 3 points

- a The team from Valley High School scored seven tries, three conversions and two penalty goals. They played Hastings High School which scored six tries, two conversions and six drop goals. Who won and by how much?
- b In a different game between a Rotorua school and a Tauranga school the final score was 72 to 26.
The Rotorua school scored 11 tries and the Tauranga school scored 3 tries.
Work out some ways the teams might have scored the other points.



- 3 Three families went to the rugby.
- a Six adults and nine children bought individual tickets.
How much did this cost altogether?
- b How much cheaper would it have been if they had bought three family tickets?

Inter-school rugby tournament	
Adults	\$12
Children	\$6
Family (2 adults and 3 children)	\$35.50

- 4  A bus company was offering a special deal for the rugby.
For every six tickets bought, one extra free ticket was given.

- a How many free tickets would you get if you bought this many tickets?
- i** 48 **ii** 57 **iii** 75
- b A group bought just enough tickets to get seven free tickets.
How many tickets would they have altogether?

Deliveries



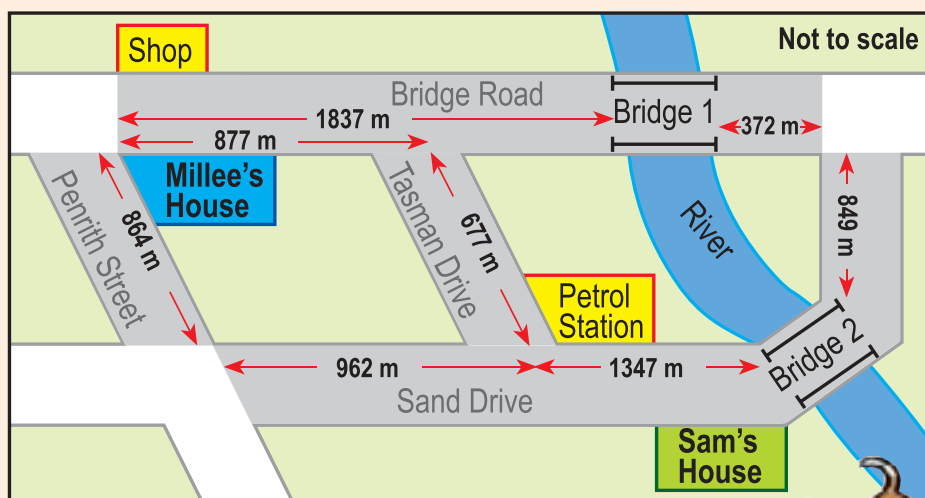
Find the answers to these using an efficient strategy.
Always try to find the answer mentally first using your knowledge of basic facts.
Show your thinking.

1 Russ the postman walked 96 km each week.

- How far did he walk each day if he walked the same distance each day?
- How far would he travel in 4 weeks?
- One week he was sick for 2 days. How far did he walk that week?



2 This map shows the area where Millee and Sam live.



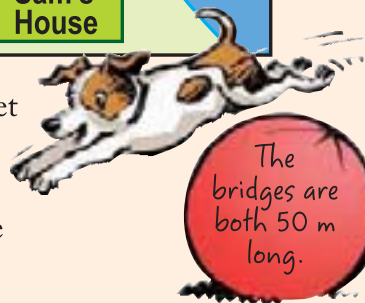
- Millee walked to Sam's house along Penrith Street and Sand Drive. About how far did she walk?
- How much shorter is it for Millee to walk to the petrol station via Bridge Road and Tasman Drive than via Penrith Street and Sand Drive?

c Sam has a paper round.

He starts at the shop and finishes at the shop.
He works out that his paper round is 7.685 km long.

Work out two possible routes he could have taken if he walked along the shaded sections of road.

- A 135 m stretch of Sand Drive has street lights put in every 5 m. If there is one light at each end of the 135 m stretch, how many lights would there be?



Animal hospital



Find the answers to these using an efficient strategy.
Always try to find the answer mentally first using your knowledge of basic facts.
Show your thinking.

- 1 At an animal hospital the vet weighs injured animals before and after feeding. Find the missing information.

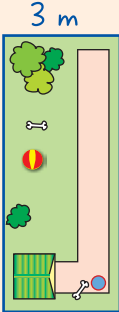
Animal	Before feed	After feed	Weight gain
Ratty	596 g	647 g	a
Pinky	2388 g	b	89 g
Wingnut	c	3897 g	57 g

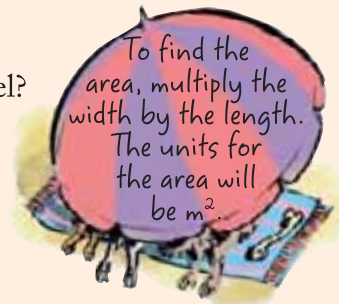


- 2 The vet mixed together 45 ml of painkiller and 18 ml of sedative. He then divided the total amount equally amongst 9 dogs. How much did each dog get?

- 3 The animal hospital was a rectangular building. Ralph, the German shepherd dog, walked right around the perimeter of the building and then another 328 m further. How far did he walk altogether?



- 4  a A rectangular dog recovery kennel is 3 m wide and 8 m long. What is the area of the recovery kennel?
b There are three recovery kennels. What is the total area of the three of them?



- 5 The bags of dog food are stored on shelves in the feeding area. There are seven shelves that hold eight bags of food and the other shelves all hold four. How many shelves will be needed for 128 bags?

- 6 Vikki, the veterinary nurse, shared out 51 vitamin pills to the cats one day. Some cats had 3 vitamin pills and some cats had 5 vitamin pills. How many cats were in the hospital that day? Is there more than one answer?



Three puzzles



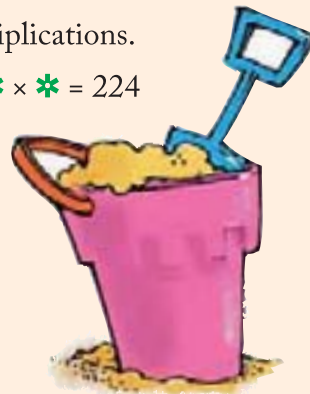
Find the answers to these using an efficient strategy.
Always try to find the answer mentally first using your knowledge of basic facts.
Show your thinking.

1 What number?

Find the digit that each symbol stands for in these multiplications.

a $\heartsuit \times 2 \times 3 = 18\heartsuit$ b $\spadesuit \spadesuit \times 4 = 3\spadesuit 6$ c $2* \times * = 224$

d \heartsuit and \spadesuit and $*$ stand for three digits
 $\heartsuit + \spadesuit * = 16$ and $\heartsuit \times \spadesuit * = 48$.
What digits do \heartsuit and \spadesuit and $*$ stand for?



2 What picture?

Trace these dots and numbers into your book.



Find the answers to the multiplications and divisions below.
Use straight lines to join the dots in the order in which the questions are given.

- a 18×4 b 11×6 c 18×3 d 25×7 e 39×2
f 19×6 g $48 \div 4$ h $95 \div 5$ i $86 \div 2$ j 55×3
k 42×5 l $84 \div 3$ m $96 \div 6$ n 16×6 o $112 \div 8$
p 36×2

3 What is my number?

a I divide a number by 8 and get the answer 12.
What number did I divide?



b I multiply 13 by a number and get 65.
What is the number?



c I multiplied a whole number by six to get the closest answer I could to 100.
What number did I multiply?



Problem solving

Think carefully about these problems.

Record your thinking and the strategies you used to solve them.

- 1 Suri, Tamsyn, Gareth and Aroha played a game.

Suri



I got twice as many points as Tamsyn.

Gareth



I got five points.

Aroha



Use your knowledge of basic facts if you can.

I got five more points than Gareth but six less than Suri.

How many points did Suri, Tamsyn and Aroha get?

- 2



Mr Blake has 15 llamas.

He wants to put them in two pens so that one pen has twice as many as the other. How many llamas will be in each pen?

- 3 Jasmine saw some emus and some pigs in a farmyard. She counted 50 legs and 18 heads. How many emus and how many pigs did she see?

- 4 Grandma Rich offered each of her five grandchildren the same deal.

I will give you \$1 each day for seven days or I will give you 10 cents the first day and 20 cents on the second day and 40 cents on the third day and so on for seven days. Each day I will give you twice what I gave you the day before.

- a Which offer is best and by how much?
b If each grandchild chose the first deal, how much would it cost Grandma Rich?
c If each chose the second deal, how much would it cost her?

- 5

SONNY'S
second-hand
STORE

CDs \$5
DVDs \$8

Tiana and her friends spent \$116 at the second-hand store and bought some CDs and some DVDs.

How many of each did they buy? Find all the possible answers.

