

Chapter 1 Algebra

Practice 1 Algebraic Expressions Involving Addition and Subtraction

- 1 There are k marbles in a box at first. Some marbles are then added.



Write an algebraic expression in each row below to represent the number of marbles.

	Number of marbles in the box
Number of marbles at first	k
Add 1 more marble	
Add 4 more marbles	
Add 10 more marbles	

- 2 A container has w buttons at first. Some buttons are then removed.

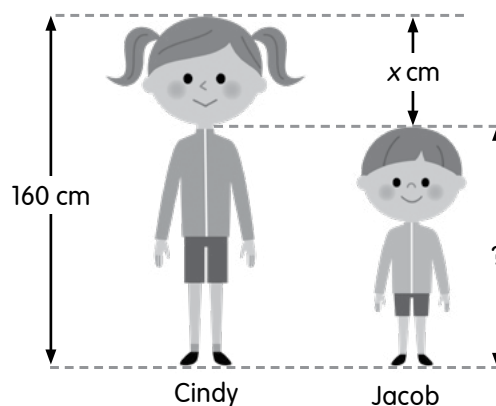


Write an algebraic expression in each row below to represent the number of buttons.

	Number of buttons in the container
Number of buttons at first	
Remove 1 button	
Remove 3 buttons	
Remove 9 buttons	

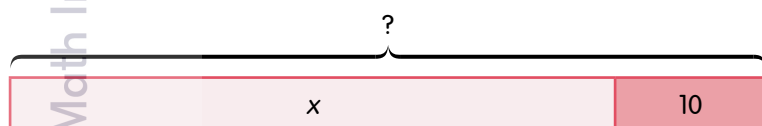
- 3 Write an algebraic expression to represent Jacob's height in terms of x .

Jacob's height is cm.



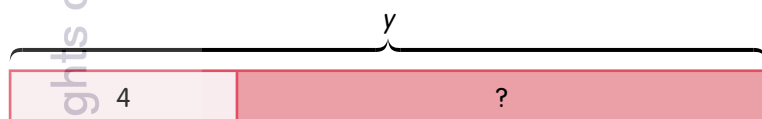
- 4 Write an algebraic expression for each of the following.

- (a) Raj has x stickers. Ali gives him 10 more stickers. How many stickers does Raj have now?



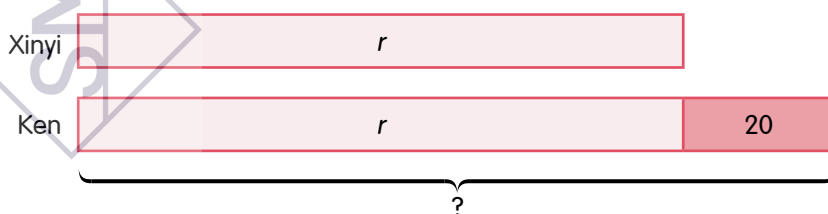
Raj has stickers now.

- (b) A pail had y ℓ of water. Mr Lim used 4 ℓ of the water to wash his car. How much water was left in the pail?



ℓ of water was left in the pail.

- (c) Xinyi has \$ r . Ken has \$20 more than Xinyi. How much money does Ken have?



Ken has \$.

- 5 Write an algebraic expression for each statement.

Statement	Algebraic Expression
(a) Add c to 35.	
(b) Subtract p from 18.	
(c) s more than 7.	
(d) k less than 30.	
(e) Sum of 12 and t .	

- 6 Sabrina is m years old.
She is 3 years older than Tina.

- (a) What is Tina's age in terms of m ?
(b) What is the total age of the two girls in terms of m ?

7 Write an algebraic expression for each of the following.

Siti saved \$25. Danny saved \$ r more than Siti.

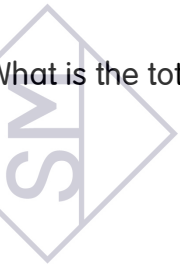
(a) How much did Danny save?

(b) How much did they save altogether?

8 Mary has a red ribbon and a green ribbon. The red ribbon is y cm long. The green ribbon is 10 cm shorter than the red ribbon.

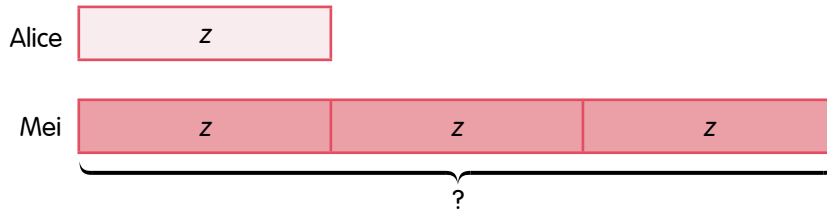
(a) What is the length of the green ribbon in terms of y ?

(b) What is the total length of the 2 ribbons in terms of y ?



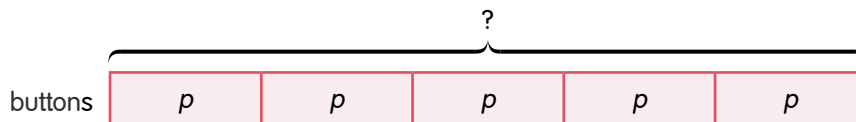
Practice 2 Algebraic Expression Involving Multiplication and Division**1** Write an algebraic expression for each of the following.

- (a) Alice has z beads. Mei has 3 times as many beads as Alice.
How many beads does Mei have?



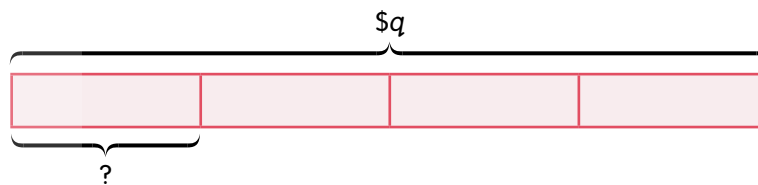
Mei has beads.

- (b) Mrs Tay has 5 boxes of buttons. Each box has p buttons.
How many buttons does Mrs Tay have altogether?



Mrs Tay has buttons altogether.

- (c) A sum of $\$q$ is shared equally among 4 people.
How much does each person receive?



Each person receives \$.

2 Write an algebraic expression for each statement.

Statement	Algebraic Expression
(a) Multiply 12 by y .	
(b) Divide x by 4.	
(c) Product of r and 7.	
(d) Three times as many as z .	

3 n cookies were shared equally among Ben, Ravi and Faizal. Ben ate 9 of his cookies.

(a) How many cookies did Ben have at first?
Write an algebraic expression in terms of n .

(b) How many cookies did Ben have in the end?
Write an algebraic expression in terms of n .



- 4 The mass of a papaya is z kg. A watermelon is 2 times as heavy as the papaya.
A bunch of bananas is 3 kg lighter than the watermelon.

(a) What is the mass of the watermelon in terms of z ?

(b) What is the mass of the bunch of bananas in terms of z ?

- 5 Jane bought a table tennis bat for \$15. She bought 4 ping pong balls at \$ q each.

(a) How much did she pay for 4 ping pong balls in terms of q ?

(b) How much did she pay for the table tennis bat and the ping pong balls together in terms of q ?

- 6 A fruit seller had $4a$ boxes of apples.
Each box had 20 apples.
He sold 13 boxes of apples.
Find the number of apples left in terms of a .

- 7 Mary has $10h$ beads.
This is 3 times the number of beads Sally has.
Denise has twice the number of beads Sally has.
Find the number of beads Denise has in terms of h .



Practice 3 Simplifying Algebraic Expressions

1 Simplify each algebraic expression.

(a) $7n + 3n$

(b) $12j + 10j$

(c) $11p - 5p$

(d) $12k - 11k$

(e) $10r + 12r + 4r$

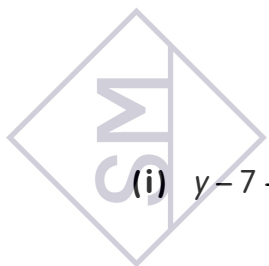
(f) $20g - 6g - 8g$

(g) $2w + 4w - w$

(h) $6x - 2x + 5x$

(i) $y - 7 + 3y$

(j) $24c + 9 - 10c$



2 Simplify each algebraic expression.

(a) $2 + j + 7 + 7j$

(b) $12q - 5q - 6 + 6q$

(c) $4 + 15m + 6 - 4m$

(d) $6u + 7u + 20 - 12u$

(e) $16f - 3f - 8 - f$

(f) $23v + 9 - 10v - 5$

(g) $25s + 10 - 4s + 6s - 8$

(h) $15 + 36v - 4v - 8v - 10$



Practice 5 Solving Algebraic Equations

- 1 Leila had \$ x . Maggie had \$10 more than Leila.
- (a) How much did Maggie have in terms of x ?
 - (b) If Maggie had \$28, how much money did Leila have?

- 2 Alice has y bracelets. Bernice has 4 times as many bracelets as Alice.
- (a) How many bracelets does Bernice have in terms of y ?
 - (b) If Bernice has 12 bracelets, how many bracelets does Alice have?



- 3 Mike had g stickers.
Nathan had $5g$ stickers.
They had 48 stickers altogether.
How many stickers did Mike have?

- 4 There are 273 people at the cinema.
There are 85 more children than adults.
How many children are there at the cinema?
Solve this problem using algebra by letting x be the number of adults.



- 5 A rope is 95 cm long.
It is cut into 3 pieces and their lengths are $3r$ cm, $(r + 10)$ cm and r cm.
What is the length of the shortest rope?



$3r$ cm



$(r + 10)$ cm



r cm

- 6 The sum of 3 numbers is 33.
The second number is 2 more than the first number.
The third number is 2 more than the second number.
What is the smallest number?

- 7 Alex is q years old.
His sister is 4 years older than he is.
His brother is 2 years older than his sister.
The sum of their ages is 70. Find Alex's age.

- 8 Tim is x years old now.
John is 9 years older than Tim.
In 4 years' time, the sum of their ages will be 91.
How old is Tim now?

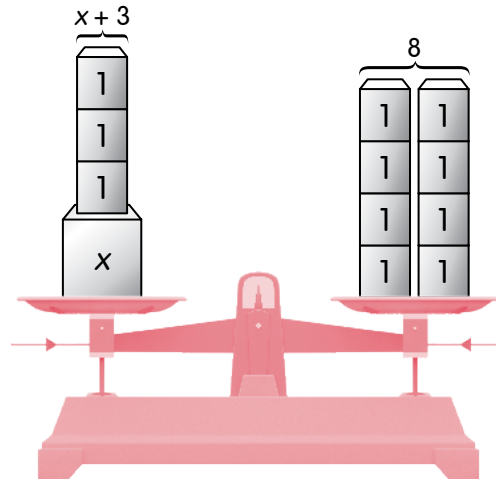


Performance Task



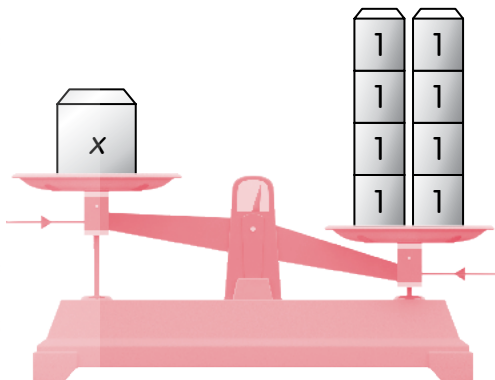
Activity: Using the concept of balance to solve an equation.

The balance in the diagram shows the equation $x + 3 = 8$.

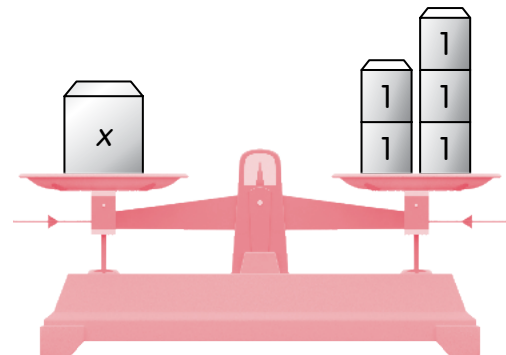


With the aid of the diagrams below, find the value of x in 2 steps.

Step 1



Step 2



(a) In Step 1, we remove units from the left-hand side of the balance.

(b) In Step 2, we remove units from the right-hand side of the balance.

(c) Find the value of x .

$$x + 3 - \text{ } = 8 - \text{ }$$

$$x = \text{ }$$