

WALT understand algebra and its terms and symbols

Success Criteria I know ...

- In algebra letters can be used to stand for unknown numbers
- H for height, P for price or population, T for temperature
- Letters and numbers can be combined
- $5 \times n$ can be written as $5n$

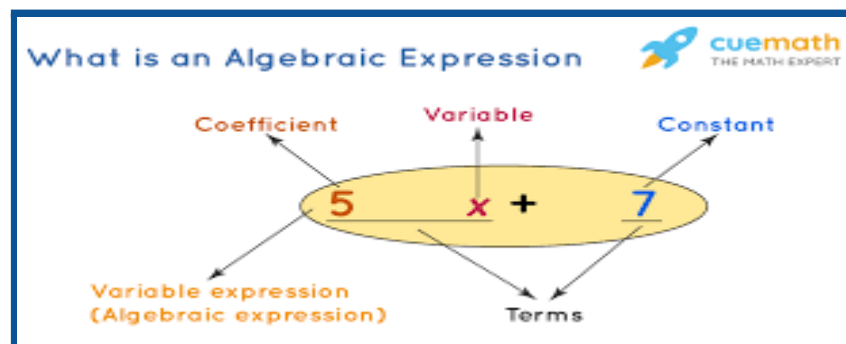
Let's write a story



Expression	Story
$3 \times b$	Packets of biscuits each have b biscuits in them. (b is not known.) Ahmed opens three packets of biscuits to serve at a party. The number of biscuits is $3b$.
$3 \times c - 5$	
$2 \times d + 10$	

Let's learn some terminology

1. **Pronumeral** - A letter or symbol used to represent number
2. **Constant term** -The part of the expression without any pronumeral
3. **Expression** -A group of mathematical terms that does not contain an equal sign
4. **Coefficient**- A numeral placed before a pronumeral



Understanding

- 1 Which of the following is the common way to write $7 \times a$?
A seven times a **B** $7a$ **C** a^7 **D** $\frac{7}{a}$
- 2 Which of the following is the common way to write $5 \div m$?
A $\frac{m}{5}$ **B** five divided by m **C** $\frac{5}{m}$ **D** $5m$

In algebra, $5 \times b$ is written $5b$.



Listing Terms

List the individual terms in the expression $3a + b + 13$.

Solution

Explanation

There are three terms: $3a$, b and 13 .

Each part of an expression is a term.

Your turn to list terms

- 3 List the terms in each of the following.
a $2x + 7y$ **b** $3a + 2c + e$ **c** $5q + 3r + 2s$ **d** $7d + 5f + 17$

Stating Coefficient

State the coefficient of each pronumeral in the expression $3a + 2b + 13c$.

Solution

Explanation

The coefficient of a is 3.
 The coefficient of b is 2.
 The coefficient of c is 13.

The coefficient is the number in front of a pronumeral.

Your turn now

- 4 **a** State the coefficient of x in $3x + 5y$.
b State the coefficient of b in $7a + 13b + 5c$.
c State the coefficient of k in $10 + 4k$.

Fluency

- 5 For each of the following expressions, state:
i the number of terms
ii the coefficient of n
- a** $17n + 24$ **b** $31 + 27a + 15n$
c $15nw + 21n + 15$ **d** $15a - 32b + 2n + 4xy$
e $n + 51$ **f** $5bn - 12 + \frac{d}{5} + 12n$

Terms can be added or subtracted to form an expression.



Writing expressions from word descriptions

Write an expression for the following.

- a** 5 more than k **b** 3 less than m **c** the sum of a and b
d double the value of x **e** the product of c and d

Solution

Explanation

- | | |
|------------------------------------|--|
| a $k + 5$ | 5 must be added to k to get 5 more than k . |
| b $m - 3$ | 3 is subtracted from m . |
| c $a + b$ | a and b are added to obtain their sum. |
| d $2 \times x$ or just $2x$ | x is multiplied by 2. The multiplication sign is optional. |
| e $c \times d$ or just cd | c and d are multiplied to obtain their product. |

Write an expression for the following

- 6** Write an expression for the following.
- | | |
|-----------------------------------|-----------------------------------|
| a 3 more than x | b the sum of k and 5 |
| c 2 is added to b | d 3 less than g |
| e 4 is subtracted from H | f 6 is subtracted from M |
- 7** Write an expression for the following without using \times or \div .
- | | |
|--|---|
| a double the value of u | b 4 lots of y |
| c 3 is multiplied by x | d the product of k and 10 |
| e y is divided by 8 | f half of z |
| g a is tripled, then 4 is added | h p is doubled, then 12 is added |

'Product' tells you to use multiplication.
The product of 3 and 10 is $3 \times 10 = 30$.



Problem Solving

- 8** In a room there are k people, and then 5 people leave. How many people are now in the room?
- A** $k + 5$ **B** 5 **C** $k - 5$ **D** $5k$
- 9** Nicholas buys 10 lolly bags from a supermarket.
- a** If there are 7 lollies in each bag, how many lollies does he buy in total?
- b** If there are n lollies in each bag, how many lollies does he buy in total?
- 10** Mikayla is paid $\$x$ per hour at her job. Write an expression for each of the following.
- a** How much does Mikayla earn if she works 8 hours?
- b** If Mikayla gets a pay rise of $\$3$ per hour, what is her new hourly wage?
- c** If Mikayla works for 8 hours at the increased hourly rate, how much does she earn?

For part **b**, write an expression involving n .



Extension

11 Recall that there are 100 centimetres in 1 metre and 1000 metres in 1 kilometre. Write expressions for each of the following.

- a** How many metres are there in x kilometres?
- b** How many centimetres are there in x metres?
- c** How many centimetres are there in x kilometres?



12 If b is an even number greater than 3, say whether these statements are true or false.

- a** $b + 1$ must be even.
- b** $b + 2$ could be odd.
- c** $5 + b$ could be greater than 10.
- d** $5b$ must be greater than b .
- e** $2b$ must be greater than 10.
- f** $\frac{b}{2}$ is a whole number.



Restaurant algebra

13 A group of people go out to a restaurant, and the total amount they must pay (in dollars) is A . They split the bill equally. Write expressions to answer the following questions.

- a** If there are 4 people in the group, how much do they each pay?
- b** If there are n people in the group, how much do they each pay?
- c** One of the n people has a voucher that reduces the total bill by \$20.
 - i** How much does each person pay now?
 - ii** If the bill is \$200 and $n = 6$, how much does each person end up paying?



Check your Answers

1 B

2 C

3 a $2x, 7y$

b $3a, 3c, e$

c $5q, 3r, 2s$

d $7d, 5f, 17$

4 a 3

b 13

c 4

5 a i 2

ii 17

b i 3

ii 15

c i 3

ii 21

d i 4

ii 2

e i 2

ii 1

f i 4

ii 12

6 a $x + 3$

b $k + 5$

c $b + 2$

d $g - 3$

e $H - 4$

f $M - 6$

7 a $2u$

b $4y$

c $3x$

d $10k$

e $\frac{y}{8}$

f $\frac{z}{2}$

g $3a + 4$

h $2p + 12$

8 C

9 a 70

b $10n$

10 a $8x$

b $x + 3$

c $8(x + 3)$

11 a $1000x$

b $100x$

c $100000x$

12 a false

b false

c true

d true

e false

f true

13 a $\frac{\$A}{4}$

b $\frac{\$A}{n}$

c i $\frac{\$A - 20}{n}$ ii \$30

