Substitution

Notes and Guidance

Children substitute into simple expressions to find a particular value.

They have already experienced inputting into a function machine, and teachers can make the links between these two concepts.

Children will need to understand that the same expression can have different values depending on what has been substituted.

Mathematical Talk

Which letter represents the star?
Which letter represents the heart?
Would it still be correct if it was written as $a + b + c$?

What does it mean when a number is next to a letter?

Is $a + b + b$ the same as $a + 2b$?

Remember 2b is the same as 2 x b

Varied Fluency

If ⭐ = 7 and 🤍 = 5, what is the value of:

$$⭐ + 🤍 + 🤍$$

If $a = 7$ and $b = 5$ what is the value of:

$$a + b + b$$

What is the same and what is different about this question?

Substitute the following to work out the values of the expressions.

$$w = 3 \quad x = 5 \quad y = 2.5$$

- $w + 10$
- $w + x$
- $y - w$

Substitute the following to work out the values of the expressions.

$$w = 10 \quad x = \frac{1}{4} \quad y = 2.5$$

- $3y$
- wx
- $12 + 8.8w$
- $wy + 4x$

Reasoning and Problem Solving

Here are two formulae.

$$p = 2a + 5$$

$$c = 10 - p$$

Find the value of c when $a = 10$

$$x = 2c + 6$$

Whitney says,

> $x = 12$ because c must be equal to 3 because it's the 3rd letter in the alphabet

Is Whitney correct?

Amir says,

> When $c = 5, x = 31$

Amir is wrong.
Explain why.
What would the correct value of x be?

Formulae

Notes and Guidance

Children substitute into familiar formulae such as those for area and volume.

They also use simple formulae to work out values of everyday activities such as the cost of a taxi or the amount of medicine to take given a person's age.

Mathematical Talk

What is a formula?
What formula do we use to find the area of a rectangle or a square?
What formula do we use to calculate the volume of a cuboid?
What formula do we use to calculate the area of a triangle?

Varied Fluency

Which of the following is a formula?
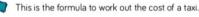
$$P = 2l + 2w \qquad 3d + 5 \qquad 20 = 3x - 2$$

Explain why the other two are not formulae.

Eva uses the formula $P = 2l + 2w$ to find the perimeter of rectangles.
Use this formula to find the perimeter of rectangles with the following lengths and widths.
- $l = 15, w = 4$
- $l = \frac{1}{4}, w = \frac{3}{8}$
- $l = w = 5.1$

This is the formula to work out the cost of a taxi.

$$C = 1.50 + 0.3m$$

C = the cost of the journey in £
m = number of miles travelled.
Work out the cost of a 12-mile taxi journey

Reasoning and Problem Solving

Jack and Dora are using the following formula to work out what they should charge for four hours of cleaning.

Cost in pounds = 20 + 10 × number of hours

Jack thinks they should charge £60
Dora thinks they should charge £120

Who do you agree with?
Why?

The rule for making scones is use 4 times as much flour (f) as butter (b).

Which is the correct formula to represent this?

A. $f = \dfrac{b}{4}$

B. $f = 4b$

C. $f = b + 4$

D. $4f = b$

Explain why the others are incorrect.