SUBSTITUTION (ONE STEP)

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

A triangle can stand for a number. To work out the answer, replace the triangle with its value.

If ▲ = 6

▲ + 2 = 6 + 2 = 8

3 × ▲ = 3 × 6 = 18

1 If ▲ = 5, work out:

a) ▲ + 4 = ☐ b) ▲ − 2 = ☐ c) 3 × ▲ = ☐

d) ▲ ÷ 5 = ☐ e) 10 − ▲ = ☐ f) ▲ × ▲ = ☐

2 Each cube is worth 4. Each counter is worth 1. Find the total.

a) 

total = ☐

b) 

total = ☐

c) 

total = ☐

3 "3 lots of 6" means 3 × 6 = 18. Work out:

a) 4 lots of 7 = ☐ b) 5 lots of 9 = ☐ c) 2 lots of 12 = ☐

4 ▲ × ▲ means multiply the number by itself.

a) If ▲ = 3, ▲ × ▲ = ☐ b) If ▲ = 6, ▲ × ▲ = ☐

5 A cinema ticket costs £▲. When ▲ = 8, how much do 3 tickets cost? £ ☐

6 Ella says, "If ▲ = 5, then 3 × ▲ is 35." Explain her mistake and give the correct answer.

7 Complete the table.

▲	▲ + 3	2 × ▲
1		
2		
5		
10		

SUBSTITUTION (ONE STEP)

SUPPORT

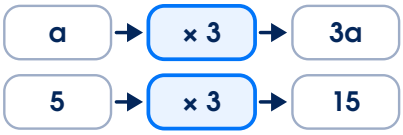
NAME _____ CLASS _____ DATE _____

KEY IDEA

Substitute means replace the letter with its value.

If a = 5, 3a = 3 × 5 = 15

3a means 3 × a



1 a = 4. Work out the value of each expression.

a) $a + 6$ = ☐ b) $a - 1$ = ☐ c) $5a$ = ☐

d) $\frac{a}{2}$ = ☐ e) $10 - a$ = ☐ f) a^2 = ☐

2 x = 6. Use the function machines to work out each expression.

a) $2x$ 6 → × 2 → ☐ b) $x + 9$ 6 → + 9 → ☐

c) $\frac{x}{3}$ 6 → ÷ 3 → ☐ d) x^2 6 → square → ☐

3 b = 10. Fill in the boxes.

a) $4b = 4 \times$ ☐ = ☐

b) $b - 3 =$ ☐ $- 3 =$ ☐

c) $\frac{b}{5} =$ ☐ $\div 5 =$ ☐

4 y = 3. Sam says 4y = 43.

a) Explain Sam's mistake. .....

b) What is the correct value of 4y? ☐

5 m = 2. Work out each one, then circle the biggest.

$m + 10$ ☐ $10m$ ☐ m^2 ☐ $10 - m$ ☐

6 A bag holds k sweets. k = 7

a) How many sweets are in 4 bags? (4k) ☐

b) Kim eats 2 sweets from one bag. How many are left? (k – 2) ☐

SUBSTITUTION (ONE STEP)

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

Substitution means replacing a letter with a value. If p = 3: $3p = 3 \times 3 = 9$, $p^2 = 3 \times 3 = 9$, $\frac{p}{3} = 3 \div 3 = 1$

Take care: $2x$, x^2 and $x + 2$ all mean different things.

1 p = 3. Work out the value of each expression.

a) $3p$ = ☐ b) $\frac{p}{3}$ = ☐ c) $\frac{3}{p}$ = ☐ d) $p + 3$ = ☐

e) $3 + p$ = ☐ f) $p - 3$ = ☐ g) $3 - p$ = ☐ h) p^2 = ☐

i) Which expressions have the same value when p = 3? .....

j) Which pairs are equal whatever the value of p? .....

2 Work out the value of each expression. You may use a calculator.

a) $\frac{x}{4}$ when x = 12 = ☐ b) 5x when x = 12 = ☐

c) y + 7 when y = –2 = ☐ d) 4y when y = –2 = ☐

e) 10w when w = 0.5 = ☐ f) w^2 when w = 0.5 = ☐

3 The perimeter, P, of a square with side length s is given by the formula P = 4s.

a) Find P when s = 7 cm. ☐ cm b) Find P when s = 2.5 cm. ☐ cm

The weight, W newtons, of a mass of m kg on Earth is about W = 10m.

c) Find W when m = 6.5 kg. ☐ N

4 Are 2w and w^2 always, sometimes or never equal? Circle and explain.

ALWAYS SOMETIMES NEVER

.....

.....

5 c = 6. Which expression is the odd one out? Explain why.

2c	c + 6	c^2	18 – c

.....

SUBSTITUTION (ONE STEP)

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

1 a = 1 and b = 0.1

a) ab = ☐ b) $\frac{a}{b}$ = ☐ c) $\frac{b}{a}$ = ☐

d) $a + b$ = ☐ e) $a - b$ = ☐

f) Write the five expressions in order, largest first.

g) Find values of a and b so that a – b is the largest. a = ☐ b = ☐

2 Find the value of the letter in each case.

a) $5k = 35$ ☐ b) $\frac{m}{4} = 2.5$ ☐

c) $12 - t = 15$ ☐ d) $y^2 = 81$ ☐

3 Is each statement always, sometimes or never true? Circle your answer.
If it is sometimes true, give an example of when it is true and when it is not.

a) w – 5 and 5 – w have the same value. ALWAYS SOMETIMES NEVER

b) $\frac{a}{4}$ is less than a. ALWAYS SOMETIMES NEVER

c) x + 7 is greater than x. ALWAYS SOMETIMES NEVER

d) n^2 is greater than n. ALWAYS SOMETIMES NEVER

4 Raj says, "In algebra a = 1, b = 2, c = 3 and so on, so ab = 2." Is Raj right? Explain.

CHALLENGE

5 Here are five expression cards. $4n$ | $n + 4$ | n^2 | $\frac{n}{4}$ | $4 - n$

a) Find a value of n that makes n + 4 the largest. n = ☐

b) Find a value of n that makes n^2 the largest. n = ☐

c) Find a value of n that makes 4 – n the largest. n = ☐