



# Simplifying and Substituting (F)

## Intervention Booklet

### Substitution

#### Things to remember:

- There is always 1 mark just for writing down the numbers you have had to put into the expression.
- Your answer must be a number – don't forget to finish the sum
- The question will always use the words "Work out the value of"

#### Questions:

1. (a) Work out the value of  $3x - 4y$  when  $x = 3$  and  $y = 2$

.....  
(2)

(b) Work out the value of  $\frac{p(q-3)}{4}$  when  $p = 2$  and  $q = -7$

.....  
(3)  
(Total 5 marks)

2. Find the value of  $t^2 - 4t$  when  $t = -3$

.....  
(Total 2 marks)

3.  $P = x^2 - 7x$   
Work out the value of  $P$  when  $x = -5$

$P =$  .....  
(Total 2 marks)

4. T, x and y are connected by the formula  
 $T = 5x + 2y$   
 $x = -3$  and  $y = 4$   
 (a) Work out the value of T.

T = .....  
**(Total 2 marks)**

**Collecting Like Terms (Simplifying)**

**Things to remember:**

- $2a$  means  $a + a$  or 2 lots of  $a$
- $a^2$  means  $a \times a$
- The sign (+ or -) belongs to the term following it. You may find it easier to identify like terms using two different highlighters.

**Questions:**

1. (a) Simplify  $a + a + a + a$   
 .....  
**(1)**

(b) Simplify  $3 \times c \times d$   
 .....  
**(1)**

(c) Simplify  $3ef + 5ef - ef$   
 .....  
**(1)**

**(Total for Question is 3 marks)**

2. (a) Simplify  $b + b + b + b$   
 .....  
**(1)**

(b) Simplify  $8n - 3n$   
 .....  
**(1)**

(c) Simplify  $3 \times c \times d$   
 .....  
**(1)**

(d) Simplify  $3x + 7y + 2x - y$   
 .....  
**(2)**

**(Total for Question is 5 marks)**

3. Simplify  $3x + 5y + x + 4y$

.....  
**(Total for Question is 2 marks)**

4. (a) Simplify  $a \times c \times 3$

.....  
**(1)**

(b) Simplify  $p \times p \times p$

.....  
**(1)**

(c) Simplify  $5x - 4y + 3x - 3y$

.....  
**(2)**  
**(Total for Question is 4 marks)**

5. (a) Simplify  $5a - 2a$

.....  
**(1)**

(b) Simplify  $3 \times 4y$

.....  
**(1)**

(c) Simplify  $3e + 4f + 2e - f$

.....  
**(2)**  
**(Total for Question is 4 marks)**

6. (a) Simplify  $m + m + m$

.....  
(1)

(b) Simplify  $9e - 2e$

.....  
(1)

(c) Simplify  $5 \times 3g$

.....  
(1)

(Total for Question is 3 marks)

### Expanding and Factorising (Single Brackets)

#### Things to remember:

- Expand brackets means to multiply what is outside the bracket with everything inside the bracket.
- Factorising is the opposite of expanding – put the HCF outside the brackets to factorise fully.

#### Questions:

1. (a) Expand  $5(m + 2)$

.....  
(1)

(b) Factorise  $y^2 + 3y$

.....  
(1)

(c) Simplify  $a^5 \times a^4$

.....  
(1)

(Total for Question is 3 marks)

2. (a) Expand  $2m(m + 3)$

.....  
(1)

(b) Factorise fully  $3xy^2 - 6xy$

.....  
(2)

(Total for Question is 3 marks)

3. (a) Expand  $3(x + 4)$

.....  
(1)

(b) Expand  $x(x^2 + 2)$

.....  
(2)

(c) Factorise  $x^2 - 6x$

.....  
(1)

**(Total for Question is 4 marks)**

4. (a) Expand and simplify  $5(x + 7) + 3(x - 2)$

.....  
(2)

(b) Factorise completely  $3a^2b + 6ab^2$

.....  
(2)  
**(Total for Question is 4 marks)**

5. (a) Expand  $3(2y - 5)$

.....  
(1)

(b) Factorise completely  $8x^2 + 4xy$

.....  
(2)  
**(Total for Question is 3 marks)**

## Expand and Factorise Quadratics

### Things to remember:

- Use FOIL (first, outside, inside, last) or the grid method (for multiplication) to expand brackets.
- For any quadratic  $ax^2 + bx + c = 0$ , find a pair of numbers with a sum of  $b$  and a product of  $ac$  to factorise.

### Questions:

1. Expand and simplify  $(m + 7)(m + 3)$

.....  
**(Total for question = 2 marks)**

2. (a) Factorise  $6 + 9x$

.....  
**(1)**

(b) Factorise  $y^2 - 16$

.....  
**(1)**

(c) Factorise  $p^2 - p - 6$

.....  
**(2)**

**(Total for Question is 4 marks)**

3. Solve, by factorising, the equation  $x^2 + 6x + 5 = 0$

.....  
**(Total for Question is 3 marks)**

4. Factorise  $x^2 + 3x - 4$

.....  
**(Total for question is 2 marks)**

5. Factorise  $x^2 + 2x - 8$ .

.....  
**(Total for question is 2 marks)**

6. (a) Expand  $4(3x + 5)$

.....  
**(1)**

(b) Expand and simplify  $2(x - 4) + 3(x + 5)$

.....  
**(2)**

(c) Expand and simplify  $(x + 4)(x + 6)$

.....  
**(2)**

**(Total for Question is 5 marks)**

7. (a) Solve by factorising  $x^2 + 5x + 4 = 0$

.....  
**(2)**

(b) Expand and simplify  $(3x - 1)(2x + 5)$

.....  
**(2)**

**(Total for Question is 4 marks)**

8. (a) Expand  $3(2 + t)$

.....  
(1)

(b) Expand  $3x(2x + 5)$

.....  
(2)

(c) Expand and simplify  $(m + 3)(m + 10)$

.....  
(2)  
**(Total for Question is 5 marks)**

9. (a) Factorise  $x^2 + 7x$

.....  
(1)

(b) Factorise  $y^2 - 10y + 16$

.....  
(2)

\*(c) (i) Solve by factorising  $t^2 + 7t + 10 = 0$

**(Total for Question is 3 marks)**