**Simplifying and Substituting (F)**

Intervention Booklet

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Useful websites:**

**www.mathswatchvle.com**

*(Video explanations and questions)*

Username: STH…@twgash

Password: stmaths

**www.methodmaths.com**

*(Past papers online that get instantly marked)*

Centre ID: wga

Username: firstname

Password: lastname

**www.hegartymaths.com**

*(Online tutorials and quizzes)*

Login: first name and last name are case sensitive

**www.bbc.co.uk/schools/gcsebitesize/maths**

 **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  when p = 2 and q = –7

 ...........................................................

 **(3)**

**(Total 5 marks)**

**2.** Find the value of

 t² – 4t when t = -3

 ...........................................................

 **(Total 2 marks)**

**3.** P = x² - 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

1. 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
* a² means a x 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 × *c* × *d*

…........................................................

 **(1)**

(c) Simplify 3*ef* + 5*ef* – *ef*

…........................................................

 **(1)**

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

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

…........................................................

 **(1)**

(b)   Simplify    8*n* – 3*n*

…........................................................

 **(1)**

(c)   Simplify    3 × *c* × *d*

…........................................................

 **(1)**

(d)   Simplify    3*x* + 7*y* + 2*x* – *y*

…........................................................

 **(2)**

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

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

…........................................................

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

**4.** (a)   Simplify     *a* × *c* × 3

…........................................................

 **(1)**

(b)   Simplify     *p* × *p* × *p*

…........................................................

 **(1)**

(c)   Simplify     5*x* – 4*y* + 3*x* – 3*y*

…........................................................

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

**5.** (a) Simplify   5*a* – 2*a*

…........................................................

 **(1)**

(b) Simplify   3 × 4*y*

…........................................................

 **(1)**

(c) Simplify   3*e* + 4*f* + 2*e* – *f*

…........................................................

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

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

…........................................................

 **(1)**

(b)   Simplify     9*e* – 2*e*

…........................................................

 **(1)**

(c)   Simplify     5 × 3*g*

…........................................................

 **(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 + 3*y*

 ...........................................................

 **(1)**

(c) Simplify       *a*5 × *a*4

 ...........................................................

 **(1)**

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

**2.** (a) Expand   2*m*(*m* + 3)

...........................................................

 **(1)**

(b) Factorise fully   3*xy*2 − 6*xy*

...........................................................

**(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 − 6*x*

 ...........................................................

 **(1)**

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

**4.** (a) Expand and simplify        5(*x* + 7) + 3(*x* – 2)

 ...........................................................

 **(2)**

(b) Factorise completely         3*a*2*b* + 6*ab*2

 ...........................................................

 **(2)**

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

**5.** (a) Expand         3(2*y* – 5)

...........................................................

 **(1)**

(b) Factorise completely         8*x*2 + 4*xy*

...........................................................

 **(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 ax² + 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 + 9*x*

……………………………………

 **(1)**

(b) Factorise      *y*2 – 16

……………………………………

 **(1)**

(c) Factorise      2*p*2 – *p* – 10

……………………………………

 **(2)**

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

**3.** Solve, by factorising, the equation      8*x*2 – 30*x* – 27 = 0

……………………………………

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

**4.** Factorise *x*2 + 3*x* – 4

……………………………………

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

**5.** Write *x*2 + 2*x* – 8 in the form (*x* + *m*)2 + *n* where *m* and *n* are integers.

……………………………………

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

**6.** (a) Expand    4(3*x* + 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) Factorise      *x*2 + 5*x* + 4

……………………………………

 **(2)**

(b) Expand and simplify    (3*x* −1)(2*x* + 5)

……………………………………

 **(2)**

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

**8.** (a) Expand    3(2 + *t*)

……………………………………

 **(1)**

(b) Expand    3*x*(2*x* + 5)

……………………………………

 **(2)**

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

……………………………………

 **(2)**

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

**9.** (a) Factorise                    *x*2 + 7*x*

……………………………………

 **(1)**

(b) Factorise                   *y*2 – 10*y* + 16

……………………………………

 **(2)**

\*(c) (i) Factorise             2*t*2 + 5*t* + 2

……………………………………

        (ii) *t* is a positive whole number.
         The expression 2*t*2 + 5*t* + 2 can never have a value that is a prime number.
         Explain why.

       ………..................................................................................................................

       ………..................................................................................................................

       ………..................................................................................................................

**(3)**

**(Total for Question is 6 marks)**