



THIRD SPACE  
LEARNING

# GCSE Maths Intervention Pack

Expanding and Factorising  
Single Brackets

Grade 4

## Teacher Notes

### Question Sets

#### Set 1: Expanding Single Brackets

Expand brackets of the form  $a(bx \pm c)$ ,  $ax(bx \pm c)$ ,  $ax(bx \pm cy)$ ,  $a(b - x)$ ,  $xy(x \pm a)$

Key words: Bracket, expand, multiply, negative, positive, squared, term

#### Set 2: Expanding and Simplifying Single Brackets

Expand and simplify expressions of the form  $a(bx \pm c) \pm d(ex \pm f)$   
and  $ax(bx \pm c) \pm dx(ex \pm f)$

Key words: Bracket, coefficient, collect like terms, expand, expressions, multiply, negative, positive, simplify, squared, term

#### Set 3: Factorising into Single Brackets

Factorise expressions into a single bracket including powers

Key words: Bracket, coefficient, expression, (fully) factorise, highest common factor, integer, multiply, negative, positive, squared, term



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**Gabriel Ogbeifun,**  
Head of Mathematics, Regent High School

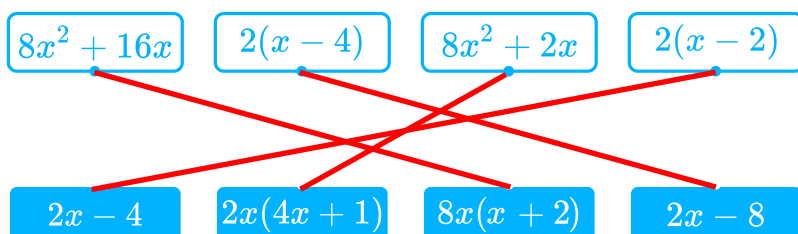


## Slide 1: Cover Slide

### Teaching Prompts

- Can you expand any of the brackets to match them with their equivalent expression?
- Can you factorise any of the expressions to match them with an equivalent expression?

### Answers



### Teacher Reference Only

#### Common Misconception

- Students do not fully factorise when factorising expressions.
- Students do not multiply all terms in the bracket when expanding brackets and add the second term. (Grid method helps to prevent student from forgetting any terms)
- Students get confused by negatives and positives. (Ensure students write the  $\pm$  sign of the value when writing in to the grid)
- Students 'lose' the negative signs when collecting like terms. (Ensure students bring the negative with the number when expanding)
- Students think  $x^2 = x \times 2$ .

### Terminology

- Factorise: Split a term into the product of numbers and variables.
- Coefficient: A number used to multiply a variable.
- Expression: Numbers, symbols and operators (such as  $+$  and  $\times$ ) grouped together that show the value of something.
- Expand: when we multiply to remove the brackets.

## Slide 2: Try these exam-style questions...

### Set 1: Expanding Single Brackets.

#### Teaching Prompts

- Can you try these questions by yourself?
- 

#### If Stuck

- Move on to the next slide.
- 

#### Mark Scheme

- a) (1 mark)  $2x - 6$
  - b) (1 mark)  $x^2 + 3x$
  - c) (1 mark) one term correct
  - c) (1 mark)  $2xy + 6x^2$
- 

#### Watch out for

- Students do not multiply all terms in the bracket when expanding brackets and add the second term. (Grid method helps to prevent student from forgetting any terms)
- Students get confused by negatives and positives. (Ensure students write the  $\pm$  sign of the value when writing in to the grid)
- Students 'lose' the negative signs when collecting like terms. (Ensure students bring the negative with the number when expanding)

## Slide 3: Let's go through it together...

Set 1: Expanding Single Brackets.

### Teaching Prompts

- What is  $2 \times x$ ? ( $2x$ )
  - What is  $2 \times -3$ ? ( $-6$ )
- 

### Answers

$$2 \begin{array}{|c|c|} \hline x & -3 \\ \hline 2x & -6 \\ \hline \end{array} \quad \text{Answer: } 2x - 6$$

$$x \begin{array}{|c|c|} \hline x & +3 \\ \hline x^2 & +3x \\ \hline \end{array} \quad \text{Answer: } x^2 + 3x$$

$$2x \begin{array}{|c|c|} \hline y & +3x \\ \hline 2xy & +6x^2 \\ \hline \end{array} \quad \text{Answer: } 2xy + 6x^2$$

---

### Mark Scheme

- a) (1 mark)  $2x - 6$
- b) (1 mark)  $x^2 + 3x$
- c) (1 mark) one term correct
- c) (1 mark)  $2xy + 6x^2$

## Slide 4: Your turn...

Set 1: Expanding Single Brackets.

### Teaching Prompts

- Can you draw a grid to help you?
- 

### Mark Scheme

- a) (1 mark)  $8 - 4x$
  - b) (1 mark) one term correct
  - b) (1 mark)  $-2x - x^2$
  - c) (1 mark) one term correct
  - c) (1 mark)  $a^2b + 2ab$
-

## Slide 5: Try these exam-style questions...

### Set 2: Expanding and Simplifying Single Brackets.

#### Teaching Prompts

- Can you try these questions by yourself?
  - Can you employ any strategies we used in the previous slide?
- 

#### If Stuck

- Move on to the next slide.
- 

#### Mark Scheme

- a) (1 mark) expands brackets correctly  $2x - 6$  and  $3x + 6$
  - a) (1 mark) collects terms to give  $5x$
  - b) (1 mark) expands brackets correctly  $9 + 3m$  and  $-3m + 12$
  - b) (1 mark) collects terms to give  $21$
  - c) (1 mark) expands brackets correctly  $4x + 2x^2$  and  $-3x - 6$
  - c) (1 mark) collects terms to give  $2x^2 + x - 6$
- 

#### Watch out for

- Students do not multiply all terms in the bracket when expanding brackets and add the second term. (Grid method helps to prevent student from forgetting any terms)
- Students get confused by negatives and positives. (Ensure students write the  $\pm$  sign of the value when writing in to the grid)
- Students 'lose' the negative signs when collecting like terms. (Ensure students bring the negative with the number when expanding)
- Students think  $x^2 = x \times 2$ .

## Slide 6: Let's go through it together...

Set 2: Expanding and Simplifying Single Brackets.

### Teaching Prompts

- Can you complete the grids using the expression above?
- 

### Answers

1. Use the grids below to expand the bracket in a).

$$\begin{array}{r} x \quad -3 \\ 2 \quad \boxed{\begin{array}{|c|c|} \hline 2x & -6 \\ \hline \end{array}} \\ x \quad +2 \\ +3 \quad \boxed{\begin{array}{|c|c|} \hline +3x & +6 \\ \hline \end{array}} \end{array}$$

2. Add together the expressions and collect like terms.

$$2x - 6 + 3x + 6 = 5x$$

---

### Mark Scheme

- a) (1 mark) expands brackets correctly  $2x - 6$  and  $3x + 6$   
a) (1 mark) collects terms to give  $5x$

## Slide 7: Let's go through it together...

Set 2: Expanding and Simplifying Single Brackets.

### Teaching Prompts

- Can you complete the grids using the expression above?
- 

### Answer

- Use the grids below to expand the bracket in b).

$$\begin{array}{cc} 3 & +m \\ 3 & \begin{array}{|c|c|} \hline 9 & +3m \\ \hline \end{array} \\ m & -4 \\ -3 & \begin{array}{|c|c|} \hline -3m & +12 \\ \hline \end{array} \end{array}$$

Be careful with negatives!

- Add together the expressions and collect like terms.

$$9 + 3m - 3m + 12 = 21$$

---

### Mark Scheme

- b) (1 mark) expands brackets correctly  $9 + 3m$  and  $-3m + 12$   
b) (1 mark) collects terms to give 21

## Slide 8: Let's go through it together...

Set 2: Expanding and Simplifying Single Brackets.

### Teaching Prompts

- Can you complete the grids using the expression above?
- 

### Answers

- Use the grids below to expand the bracket in a).

$$2x \begin{array}{|c|c|} \hline x & +x \\ \hline 4x & +2x^2 \\ \hline \end{array}$$

$$-3 \begin{array}{|c|c|} \hline x & +2 \\ \hline -3x & -6 \\ \hline \end{array}$$

Be careful with negatives!

- Add together the expressions and collect like terms.

$$\begin{aligned} 4x + 2x^2 - 3x - 6 \\ = 2x^2 + x - 6 \end{aligned}$$

---

### Mark Scheme

- c) (1 mark) expands brackets correctly  $4x + 2x^2$  and  $-3x - 6$
- c) (1 mark) collects terms to give  $2x^2 + x - 6$



## Slide 9: Your turn...

Set 2: Expanding and Simplifying Single Brackets.

### Teaching Prompts

- Can you try these questions by yourself?
  - Can you employ any strategies we used in the previous slide?
- 

### Mark Scheme

- a) (1 mark) expands brackets correctly  $8 - 4x$  and  $5x - 5$
- a) (1 mark) collects terms to give  $x + 3$
- b)(1 mark) expands brackets correctly  $5a + 10$  and  $-3a + 12$
- b) (1 mark) collects terms to give  $2a + 22$
- c) (1 mark) expands brackets correctly  $5x + x^2$  and  $-3x^2 - 6x$
- c) (1 mark) collects terms to give  $-2x^2 - x$

## Slide 10: Try these exam-style questions...

### Set 3: Factorising Single Brackets.

#### Teaching Prompts

- Can you try these questions by yourself?
- 

#### If stuck

- Move on to the next slide.
- 

#### Mark Scheme

- a) (1 mark)  $5(x - 3)$
  - b)(1 mark)  $y(y + 3)$
  - c) (1 mark) factorises by 3 or  $a$  or  $b$
  - c) (1 mark)  $3ab(1 + 3a)$
- 

#### Watch out for

- Students do not fully factorise when factorising expressions.
- Students think  $x^2 = x \times 2$ .

## Slide 11: Let's go through it together...

Set 3: Factorising Single Brackets.

### Teaching Prompts

- Can you write  $5x$  as a multiplication? ( $5 \times x$ )
  - Can you write  $-15$  as a factor pair? ( $5 \times 3$ )
  - What value divides into both  $5x$  and  $-15$ ? ( $5$ )
- 

### Mark Scheme

a) (1 mark)  $5(x - 3)$

## Slide 12: Let's go through it together...

Set 3: Factorising Single Brackets.

### Teaching Prompts

- Can you write  $y^2$  as a multiplication? ( $y \times y$ )
  - Can you write  $3y$  as a multiplication? ( $3 \times y$ )
  - What value divides into both  $y^2$  and  $3y$ ? ( $y$ )
- 

### Mark Scheme

b) (1 mark)  $y(y + 3)$

## Slide 13: Let's go through it together...

Set 3: Factorising Single Brackets.

### Teaching Prompts

- Can you write  $3ab$  as a multiplication? ( $3 \times a \times b$ )
  - Can you write  $9a^2b$  as a multiplication? ( $9 \times a \times a \times b$ )
  - What value divides into both  $3ab$  and  $9a^2b$ ? ( $3$ ,  $a$  and  $b$ )
- 

### Mark Scheme

- c) (1 mark) factorises by 3 or  $a$  or  $b$
- c) (1 mark)  $3ab(1 + 3a)$

## Slide 14: Your turn...

Set 3: Factorising Single Brackets.

### Teaching Prompts

- What divides into both  $6x$  and  $-9$ ?
  - What divides into both  $4a$  and  $-a^2$ ?
  - What divides into both  $5f^2g^2$  and  $20g$ ?
- 

### Mark Scheme

- a) (1 mark)  $3(2x - 3)$
- b) (1 mark)  $a(4 - a)$
- c) (1 mark) factorises by 5 or  $g$
- c) (1 mark)  $5g(f^2g + 4)$

## Slide 15: Ready for a Challenge?

### Teaching Prompts

- Can you try this question by yourself?
- 

### If Stuck

- How do you find the area of a shape? (multiply the length by the width)
- 

### Mark Scheme

- a) (1 mark) attempt to multiply  $2x$  and  $x - y$ , one term correct
- a) (1 mark)  $2x^2 - 2xy$
- b) (1 mark) attempt to factorise  $3a + 9ab$
- b) (1 mark)  $3a(1 + 3b)$  so  $l = 3a$

## Slide 16: What have we learnt?

- Can you see where the student has gone wrong? (they have expanded incorrectly by only multiplying the first term in the second bracket)
  - What should they have done instead? ( $2x + 6 - 5x - 10$ )
  - Then simplify by collecting like terms.
- 
- Can you see where the student has gone wrong? (they have not fully factorised)
  - What should they have done instead? (both values are divisible by 15 and  $x$  so they need to take both of these out of the brackets)
- 

## Answers

a)  $-3x - 4$

b)  $15x(x - 2)$



# Expanding and Factorising Single Brackets

Match the following expressions.

$$8x^2 + 16x$$

$$2(x - 4)$$

$$8x^2 + 2x$$

$$2(x - 2)$$

$$2x - 4$$

$$2x(4x + 1)$$

$$8x(x + 2)$$

$$2x - 8$$

## Try these exam-style questions...

Expand the expressions.

a)  $2(x - 3)$

.....  
(1)

b)  $x(x + 3)$

.....  
(1)

c)  $2x(y + 3x)$

.....  
(2)

## Let's go through it together...

Expand the expressions.

a)  $2(x - 3)$

.....  
(1)

b)  $x(x + 3)$

.....  
(1)

c)  $2x(y + 3x)$

.....  
(2)

To expand a bracket, we need to multiply everything inside the bracket by the term on the outside.

It can help to use a grid to do this.

E.g.  $3(x + 2)$

	$x$	$+2$
$3$	$3x$	$+6$

- 1 Use the grids below to expand the brackets in a) b) and c)

2

	$x$	$-3$

$x$


.....


## Your turn...

Expand the expressions.

a)  $4(2 - x)$

.....  
(1)

b)  $-x(2 + x)$

.....  
(2)

c)  $ab(a + 2)$

.....  
(2)

## Try these exam-style questions...

Expand the expressions.

a)  $2(x - 3) + 3(x + 2)$

.....  
(1)

b)  $3(3 + m) - 3(m - 4)$

.....  
(1)

c)  $2x(2 + x) - 3(x + 2)$

.....  
(2)

## Let's go through it together...

Expand and simplify the expressions.

a)  $2(x - 3) + 3(x + 2)$

To **expand and simplify** sets of brackets we need to **expand each bracket individually** first, then **collect like terms**.

E.g.  $3(x + 2) - 2(4 - x)$

$$\begin{array}{rcl} 3(x + 2) & 3 & \begin{array}{|c|c|} \hline x & +2 \\ \hline 3x & +6 \\ \hline \end{array} \\ - 2(4 - x) & - 2 & \begin{array}{|c|c|} \hline 4 & -x \\ \hline -8 & +2x \\ \hline \end{array} \end{array}$$

$$\begin{aligned} &= 3x + 6 - 8 + 2x \\ &= 5x - 2 \end{aligned}$$

1 Use the grids below to expand the brackets in a).

.....

--	--

.....

.....

--	--

.....

2 Add together the expressions and collect like terms.

.....  
(2)

## Let's go through it together...

Expand and simplify the expressions.

b)  $3(3 + m) - 3(m - 4)$

1 Use the grids below to expand the brackets in b).

.....

--	--

.....

.....

--	--

.....

Be careful with negatives!

2 Add together the expressions and collect like terms.

.....  
(2)

## Let's go through it together...

Expand and simplify the expressions.

c)  $2x(2 + x) - 3(x + 2)$

1

Use the grids below to expand the brackets in c).

.....

--	--

.....

.....

--	--

.....

Be careful with negatives!

2

Add together the expressions and collect like terms.

.....

(2)



## Your turn...

Expand and simplify the expressions.

a)  $4(2 - x) + 5(x - 1)$

.....  
(2)

b)  $5(a + 2) - 3(a - 4)$

.....  
(2)

c)  $x(5 + x) - 3x(x + 2)$

.....  
(2)

## Try these exam-style questions...

Fully factorise the expressions.

a)  $5x - 15$

.....  
(1)

b)  $y^2 + 3y$

.....  
(1)

c)  $3ab + 9a^2b$

.....  
(2)

## Let's go through it together...

Fully factorise the expression.

a)  $5x - 15$

In order to fully factorise an expression, we need to find the **highest common factor** of the terms.

Sometimes this is just a **number**.

E.g.

$$\begin{array}{c} 4f + 6 \\ \underbrace{\qquad\qquad\qquad} \\ 2 \times 2 \times f \qquad\qquad 2 \times 3 \end{array}$$

$$\text{HCF} = 2$$

Fully factorised:  $2(2f + 3)$

1 Fully factorise a).

## Let's go through it together...

Fully factorise the expression.

b)  $y^2 + 3y$

In order to **fully factorise** an expression, we need to find the **highest common factor** of the terms.

Sometimes it will be an **unknown**.

E.g.

$$\begin{array}{c} a^2 + 6a \\ \underbrace{\hspace{1.5cm}} \\ a \times a \qquad \qquad 6 \times a \\ \text{HCF} = a \end{array}$$

Fully factorised:  $a(a + 6)$

1 Fully factorise b).

## Let's go through it together...

Fully factorise the expression.

c)  $3ab + 9a^2b$

In order to **fully factorise** an expression, we need to find the **highest common factor** of the terms.

Sometimes it will be an **unknown and a number**.

E.g.

$$\begin{array}{c} 5a^2 + 10a \\ \underbrace{\hspace{10em}} \\ 5 \times a \times a \qquad \qquad 5 \times 2 \times a \end{array}$$

$$\text{HCF} = 5a$$

Fully factorised:  $5a(a + 2)$

- 1 Fully factorise c).

## Your turn...

Fully factorise the expressions.

a)  $6x - 9$

.....  
(2)

b)  $4a - a^2$

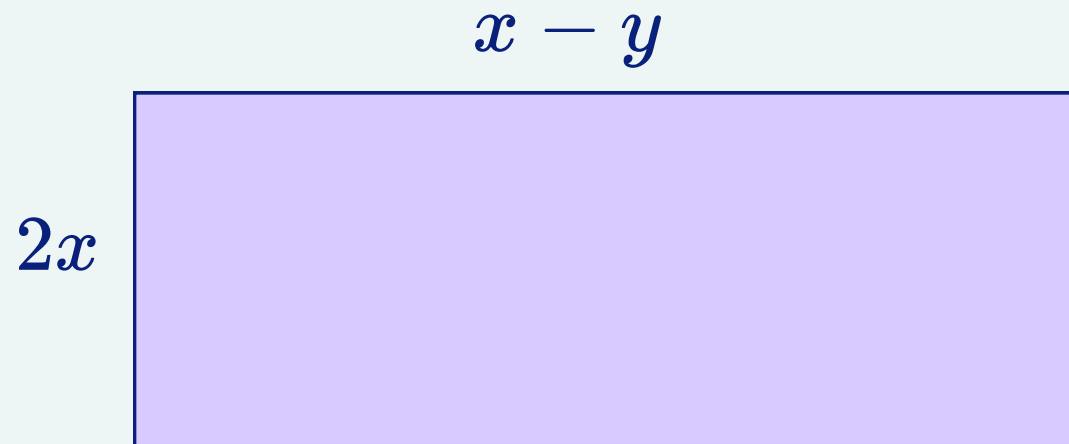
.....  
(2)

c)  $5f^2g^2 + 20g$

.....  
(2)

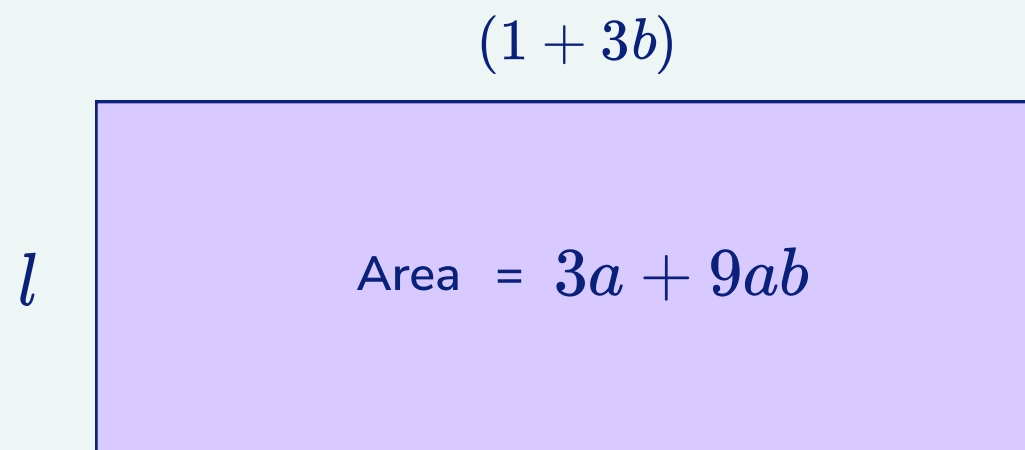
## Ready for a Challenge?

a) Write an expression for the area of the shape below.



.....  
(2)

b) Find an expression for the missing length  $l$ .



.....  
(2)

## What have we learnt?

Can you correct the answers to the questions below?

Expand and simplify the expression.

$$2(x + 3) - 5(x + 2)$$

$$2x + 6 - 5x + 2$$

$$= 7x + 8$$

Fully factorise the expression.

$$15x^2 - 30x$$

$$15x^2 - 30x$$

$$5(3x^2 - 6x)$$



# Where to go next?

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