Name: _____

# GCSE (1 – 9)

# Expanding Triple Brackets

**Instructions**

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

**Information**

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

**Advice**

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

**1**  Expand and Simplify  $(x + 2)(x + 4)(x + 1)$

$$(x + 2)(x^2 + x + 4x + 4)$$

$$(x + 2)(x^2 + 5x + 4)$$

$$x^3 + 5x^2 + 4x + 2x^2 + 10x + 8$$

$$\underline{x^3 + 7x^2 + 14x + 8}$$

$$\underline{x^3 + 7x^2 + 14x + 8}$$

**(Total for question 1 is 3 marks)**

**2**  Expand and Simplify  $(x - 3)(x + 5)(x - 2)$

$$(x - 3)(x^2 - 2x + 5x - 10)$$

$$(x - 3)(x^2 + 3x - 10)$$

$$x^3 + 3x^2 - 10x - 3x^2 - 9x + 30$$

$$\underline{x^3 - 19x + 30}$$

$$\underline{x^3 - 19x + 30}$$

**(Total for question 2 is 3 marks)**

3 Expand and Simplify $(x+2)(x+1)(x+5)$

$$(x+2)(x^2+5x+x+5)$$

$$(x+2)(x^2+6x+5)$$

$$x^3+6x^2+5x+2x^2+12x+10$$

$$x^3+8x^2+17x+10$$

$$x^3+8x^2+17x+10$$

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

4 Expand and Simplify $(x+4)(x+5)(x-4)$

$$(x+4)(x^2-4x+5x-20)$$

$$(x+4)(x^2+x-20)$$

$$x^3+x^2-20x+4x^2+4x-80$$

$$x^3+5x^2-16x-80$$

$$x^3+5x^2-16x-80$$

**(Total for question 4 is 3 marks)**

**5** Expand and Simplify $(x+3)(x-1)^2$

$$(x+3)(x-1)(x-1)$$

$$(x+3)(x^2-x-x+1)$$

$$(x+3)(x^2-2x+1)$$

$$x^3-2x^2+x+3x^2-6x+3$$

$$\underline{x^3+x^2-5x+3}$$

$$\underline{x^3+x^2-5x+3}$$

(Total for question 5 is 3 marks)

**6** Expand and Simplify $(x+5)(x-3)(2x-1)$

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

$$(x+5)(2x^2-7x+3)$$

$$2x^3-7x^2+3x+10x^2-35x+15$$

$$\underline{2x^3+3x^2-32x+15}$$

$$\underline{2x^3+3x^2-32x+15}$$

(Total for question 6 is 3 marks)

**7** Expand and Simplify $(2x + 1)(x + 2)(x + 3)$

$$(2x+1)(x^2 + 3x + 2x + 6)$$

$$(2x+1)(x^2 + 5x + 6)$$

$$2x^3 + 10x^2 + 12x + x^2 + 5x + 6$$

$$2x^3 + 11x^2 + 17x + 6$$

$$2x^3 + 11x^2 + 17x + 6$$

**(Total for question 7 is 3 marks)**

**8** Expand and Simplify $(2x - 3)(x - 2)(3x - 1)$

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

$$(2x - 3)(3x^2 - 7x + 2)$$

$$6x^3 - 14x^2 + 4x - 9x^2 + 21x - 6$$

$$6x^3 - 23x^2 + 25x - 6$$

$$6x^3 - 23x^2 + 25x - 6$$

**(Total for question 8 is 3 marks)**

**9** Expand and Simplify $(x-2)(3x+2)(x+5)$

$$(x-2)(3x^2+15x+2x+10)$$

$$(x-2)(3x^2+17x+10)$$

$$3x^3+17x^2+10x-6x^2-34x-20$$

$$3x^3+11x^2-24x-20$$

$$3x^3+11x^2-24x-20$$

**10** Expand and Simplify $(3x+1)(x+2)(x-4)$

$$(3x+1)(x^2-4x+2x-8)$$

$$(3x+1)(x^2-2x-8)$$

$$3x^3-6x^2-24x+x^2-2x-8$$

$$\underline{3x^3-5x^2-26x-8}$$

$$3x^3-5x^2-26x-8$$

**11** Show that $(2x + 3)(5x + 2)(x - 5) = 10x^3 - 31x^2 - 89x - 30$

for all values of $x$.

$$(2x+3)(5x^2 - 25x + 2x - 10)$$

$$(2x+3)(5x^2 - 23x - 10)$$

$$10x^3 - 46x^2 - 20x + 15x^2 - 69x - 30$$

$$\underline{10x^3 - 31x^2 - 89x - 30}$$

**(Total for question 11 is 3 marks)**

**12** Show that $(2x - 1)(3x + 2)^2 = 18x^3 + 15x^2 - 4x - 4$

for all values of $x$.

$$(2x-1)(3x+2)(3x+2)$$

$$(2x-1)(9x^2 + 6x + 6x + 4)$$

$$(2x-1)(9x^2 + 12x + 4)$$

$$18x^3 + 24x^2 + 8x - 9x^2 - 12x - 4$$

$$\underline{18x^3 + 15x^2 - 4x - 4}$$

**(Total for question 12 is 3 marks)**

**13**   Show that   $(3x - 1)(4x + 3)(x - 9) = 12x^3 - 103x^2 - 48x + 27$

for all values of $x$.

$$(3x - 1)(4x^2 - 36x + 3x - 27)$$

$$(3x - 1)(4x^2 - 33x - 27)$$

$$12x^3 - 99x^2 - 81x - 4x^2 + 33x + 27$$

$$\underline{12x^3 - 103x^2 - 48x + 27}$$

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**(Total for question 13 is 3 marks)**

**14**   Show that   $(5x - 4)(3x + 1)(2x - 7) = 30x^3 - 119x^2 + 41x + 28$

for all values of $x$.

$$(5x - 4)(6x^2 - 21x + 2x - 7)$$

$$(5x - 4)(6x^2 - 19x - 7)$$

$$30x^3 - 95x^2 - 35x - 24x^2 + 76x + 28$$

$$\underline{30x^3 - 119x^2 + 41x + 28}$$

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**(Total for question 14 is 3 marks)**