NGO & SONS
ACADEMIC COACHING

Name: _____

Class: _____

Date: _____

# YEAR 8 ALGEBRA

Junior Mathematics (5.3 Advance Course)

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|---|---|
| Lecture 1 | 1. Adding and Subtracting<br>2. Simple Distributive Law<br>3. Harder Distributive Law |
| **Lecture 2** | **4. Perfect Square Identity**<br>**5. Difference of Two Squares**<br>**6. Applications of Algebra I** |
| Lecture 3 | 7. Applications of Algebra II<br>8. Substitution<br>9. Algebraic Patterns I |
| Lecture 4 | 10. Algebraic Patterns II<br>11. Fraction Algebra<br>12. Basic Factorisation |
| Lecture 5 | 13. Grouping in Pairs<br>14. Difference of Two Squares Factorisation<br>15. Monic Quadratic Factorisation<br>16. Simplifying Fractions |

## Instructions

- For a thorough understanding of the topic, **every question in this handout is to be completed.**
- When the teacher is going through the example, **no writing is permitted.**
- **Do not skip ahead** of the teacher and complete the questions at the same pace as the teacher.
- **After copying the working out** on a separate piece of paper move onto the **tutorial booklet**.

# [4] Perfect Square Identity

- Perfect square: all terms in a squared bracket
- E.g. $(x+y)^2, (2x-3y)^2$

$(a+b)^2 = (a+b)(a+b)$
$= a^2 + ab + ab + b^2$
$= a^2 + 2ab + b^2$

$(a-b)^2 = (a-b)(a-b)$
$= a^2 - ab - ab + b^2$
$= a^2 - 2ab + b^2$

**Identity:**

$$(\boldsymbol{a+b})^{\boldsymbol{2}} = \boldsymbol{a^2 + 2ab + b^2}$$
$$(\boldsymbol{a-b})^{\boldsymbol{2}} = \boldsymbol{a^2 - 2ab + b^2}$$

- Used when expanding perfect squares.

**Examples:** Expand the following.

1. $(x+3)(x+3)$

2. $(7-x)^2$

3. $(2x-3)^2$

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

5. $(2x+3)(x+7) - (4x+1)^2$

6. $(1-2x)^2 - 3(4x-1)^2$

# [5] Difference of Two Squares

- Expansion of brackets with opposite signs.

$(a+b)(a-b) = a^2 - ab + ab + b^2$
$= a^2 - b^2$

**Identity:**

$$(\boldsymbol{a+b})(\boldsymbol{a-b}) = \boldsymbol{a^2 - b^2}$$

- Used when we expand two brackets that are the same, except one has a plus and the other has a minus.

**Examples:** Expand the following.

1. $(x+4)(x-4)$

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

3. $(6x-5y)(5y+6x)$

4. $-3(1-2x)(1+2x)$

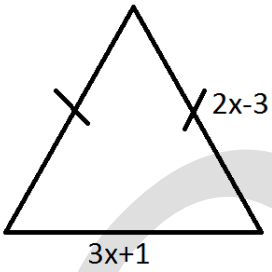
5. $(7x-5)(7x+5) - 2(3x-4)^2$

# [6] Applications of Algebra I

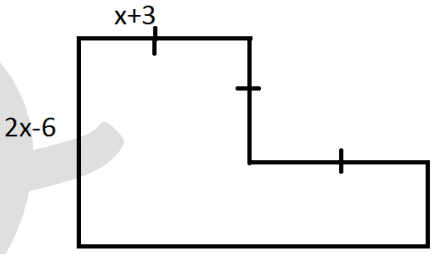
**Examples:** Write an algebraic expression for the following.

1. Find the perimeter of:

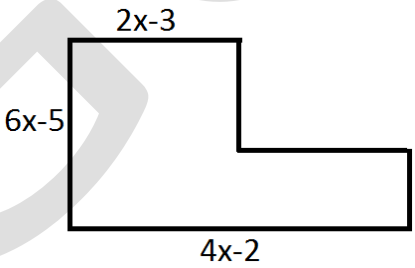
a.




b.




b.




2. Find the area of:

a.