IGCSE1 math worksheet: **Algebraic expression** Name: _____

Key notes:

- ✍ **algebraic expression:** constant, variables, operations$(+, -, \times, \div)$
- ✍ **like terms:** same variables, power for each variable is the same
- ✍ **unite like terms:** do operations on constants
- ✍ **remove parenthesis:** if + before (), keep the sign for each term inside, remove (); if - before (), change the sign for each term inside, remove ()

1. Filling blanks by using algebraic expressions:

(1) a is a rational number, the opposite number of a is _____, the absolute value of a is _____

(2) If you are m years old this year, then last year you are _____ years old, 5 years later you are _____ years old.

(3) Your dog walked s meters in t second, the velocity is _____m/s

(4) In a class of x students, 45% of them are girls, then the number of boys is _____

(5) Your parents earned 2 million dollars last year, this year they earn 20% more than last year, then earn _____ million dollars this year.

2. Write down the coefficients for each of the following

$$2x^2y,\ \frac{5s}{3t},\ -15a^2b^3,\ \frac{4m^2n}{5p},\ -a,$$

3. Write down the coefficients for each term in the following

(1) $3y + \frac{1}{2}x$

(2) $1.5v + 2v^2 - 4$

(3) $4a^2 - 4ab + b^2$

4. Are the following pairs like terms?
i) x and y ii) $3pq$ and $-2qp$ iii) $2xy^{-1}$ and $\frac{x}{6y}$ iv) 5 and -21

5. Unite like terms

(1) $3y + \frac{1}{2}y$

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

(3) $-4ab + 8 - 2b^2 - 9ab - 4$

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

(5) $3qp + 2pq - 4p \times q$

(6) $2a + 3b + 6a + 9b - 8a + 12b$

6. Unite like terms first, then calculate the value for the expression.

(1) $6x + 2x^2 - 3x + x^2 + 1$, when $x = -5$

(2) $\frac{1}{2}m - \frac{3}{2}n - \frac{5}{6}n - \frac{1}{6}m$, when $m = 6, n = 2$

(3) $3pq - \frac{4}{5}m - 4pq$, when $m = 5, p = \frac{1}{3}, q = -\frac{3}{2}$

(4) $4x^2 + 3xy - x^2 - 9$, when $x = 2, y = -3$

7. Expanding the following

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

(2) $(x - 8)^2$

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

(4) $(2x - 3)(3x - 2)$

5. Factorize the following

(1) $4x^2 - 2xy$

(2) $m^3 - m^2n + mn^2$

(3) $m^4 - n^4$

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

(5) $4x^2 - 20x + 25$

(6) $x^2 - 7x + 12$

(7) $2x^2 + 5x - 12$