Name: _____ Class: _____ ( )

DSE *Topics Supplement*

JF4 Polynomials (Expansion and Factorization)

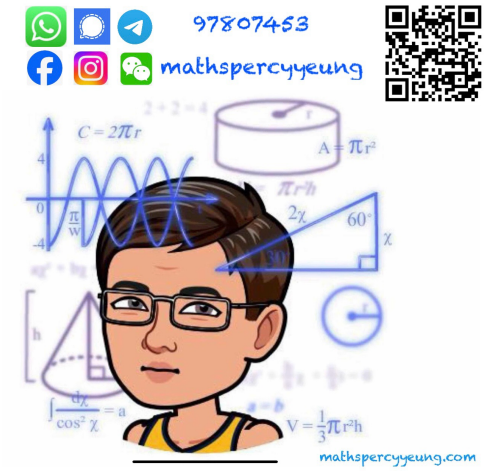
Junior Sec **Foundation Topics**

Key Review

Expansion

(a) e.g. $a(x+y)$
$= ax + ay$

(b) e.g. $(a+b)(x+y)$
$= a(x+y) + b(x+y)$
$= ax + ay + bx + by$



Factorization

(a) e.g. $abx + aby + abz$
$= ab(x+y+z)$ ◀ Take out common factors.

(b) e.g. $ax + ay + bx + by$
$= a(x+y) + b(x+y)$ ◀ Group the terms.
$= (x+y)(a+b)$

(c) $a^2 - b^2 \equiv (a+b)(a-b)$

(d) $a^2 + 2ab + b^2 \equiv (a+b)^2$

(e) $a^2 - 2ab + b^2 \equiv (a-b)^2$

(f) e.g. $x^2 - 4x + 3$
$= (x-1)(x-3)$

	x	-1
x		
-3		
	$-x$	$-3x = -4x$

$5x^2 - xy - 4y^2$
$= (5x+4y)(x-y)$

	$5x$	$+4y$
x		
$-y$		
	$4xy$	$-5xy = -xy$

Exercise 4A Conventional Questions

1. Factorize

(a) $a^2b - ab^2$,

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

Exam Reference
HKDSE 2018 (Paper 1) Q5

2. Factorize

(a) $7r^2 - 21rs$,

(b) $7r^2 - 21rs - rs^2 + 3s^3$.

Exam Reference
HKDSE 2018 (Paper 1) Q5

3. Factorize

(a) $r^3 - r^2s + 11r^2$,

(b) $r^3 - r^2s + 11r^2 - 4r + 4s - 44$.

Exam Reference
HKDSE 2015 (Paper 1) Q4

4. Factorize

(a) $49a^2 - 16b^2$,

(b) $49a^2 - 16b^2 + 20b - 35a$.

Exam Reference
HKDSE 2013 (Paper 1) Q3

5. Factorize

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

(b) $x^2 + 4x + 4 - 25y^2$.

Exam Reference
HKDSE 2022 (Paper 1) Q4

6. Factorize

(a) $4x^2 + 12xy + 9y^2$,

(b) $4x^2 + 12xy + 9y^2 - 4x - 6y$.

Exam Reference
HKDSE 2012 (Paper 1) Q3

7. Factorize

(a) $16c^2 - 8c + 1$,

(b) $(c + d)^2 - 16c^2 + 8c - 1$.

Exam Reference
HKDSE 2022 (Paper 1) Q4

8. Factorize

(a) $\alpha^2 - \alpha - 12$,

(b) $\alpha^5 - \alpha^4 - 12\alpha^3$.

Exam Reference
HKDSE 2020 (Paper 1) Q2

9. Factorize

(a) $u^2 - 6uv + 5v^2$,

(b) $u^2 - 6uv + 5v^2 - 5u + 5v$.

Exam Reference
HKDSE 2017 (Paper 1) Q3

10. Factorize

(a) $2a^2 + 7a - 4$,

(b) $ab^2 + 4b^2 + 2a^2 + 7a - 4$.

Exam Reference
HKDSE 2014 (Paper 1) Q2

11. Factorize

(a) $m^2 - 10mn + 9n^2$,

(b) $2m - 18n - m^2 + 10mn - 9n^2$.

Exam Reference
HKDSE 2021 (Paper 1) Q3

12. Factorize

(a) $3m + 9n$,

(b) $m^2 - mn - 12n^2$,

(c) $m^2 - mn - 12n^2 - 3m - 9n$.

Exam Reference
HKDSE 2016 (Paper 1) Q4

13. Factorize

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

(b) $c^2 - 10c + 25$,

(c) $a^2 + 2ab + b^2 - c^2 + 10c - 25$.

Exam Reference
HKDSE 2019 (Paper 1) Q4

Exercise 4B MC Questions

Expansion of Polynomials

1. $x^4(3x + x) =$

A. $4x^5$.

B. $3x^6$.

C. $4x^6$.

D. $3x^8$.

Exam Reference
HKDSE Practice Paper (Paper 2) Q1

2. $2a \cdot a(2a + a) =$

A. $4a^3 + a$.

B. $6a^3$.

C. $4a^4$.

D. $6a^4$.

Exam Reference
HKDSE Practice Paper (Paper 2) Q1

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

A. $x^3 - 1$.

B. $(x - 1)^3$.

C. $x^3 - x^2 - x - 1$.

D. $x^3 - 2x^2 + 2x - 1$.

Exam Reference
HKDSE 2015 (Paper 2) Q1

4. $(3x - 2)(x^2 + 2x - 4) =$

A. $3x^3 + 4x^2 - 16x + 8$.

B. $3x^3 + 4x^2 - 16x - 8$.

C. $3x^3 + 4x^2 + 8x + 8$.

D. $3x^3 + 4x^2 + 8x - 8$.

Exam Reference
HKDSE 2015 (Paper 2) Q1

5. $(a + 3b)(a - 3b - 4) =$

A. $a^2 - 9b^2 + 4a - 12b$.

B. $a^2 - 9b^2 - 4a - 12b$.

C. $a^2 - 3b^2 + 4a - 12b$.

D. $a^2 - 3b^2 - 4a - 12b$.

Exam Reference
HKDSE 2019 (Paper 2) Q1

6. $(3a - b)^2 - (3a + b)^2 =$

A. 0.

B. $-2b^2$.

C. $-6ab$.

D. $-12ab$.

Exam Reference
HKDSE 2012 (Paper 2) Q2

7. $(4a + 3b)^2 - (4a - 3b)^2 =$

A. $24ab$.

B. $48ab$.

C. $32a^2$.

D. $18b^2$.

Exam Reference
HKDSE 2012 (Paper 2) Q2

8. $(x - 3y)(x + 3y)(1 - x) =$

A. $x^3 + x^2 + 9xy^2 + 9y^2$.

B. $-x^3 + x^2 + 9xy^2 - 9y^2$.

C. $-x^3 + x^2 - 9xy^2 - 9y^2$.

D. $-x^3 - x^2 - 9xy^2 - 9y^2$.

Exam Reference
HKDSE 2021 (Paper 2) Q3

Factorization of Polynomials

9. $vx - wx - wz + wy + vz - vy =$

A. $(v + w)(x + y - z)$.

B. $(v + w)(x - y + z)$.

C. $(v - w)(x + y - z)$.

D. $(v - w)(x - y + z)$.

Exam Reference
HKDSE 2013 (Paper 2) Q3

10. $(2a - 3b)(a + 4b) + b(6a - 9b) =$

A. $(2a - 3b)(a + b)$.

B. $(2a - 3b)(a + 7b)$.

C. $(2a + 3b)(a - b)$.

D. $(2a + 3b)(a - 7b)$.

Exam Reference
HKDSE 2020 (Paper 2) Q4

11. $\alpha^2 - \alpha - \beta^2 - \beta =$

A. $(\alpha + \beta)(\alpha + \beta - 1)$.

B. $(\alpha + \beta)(\alpha - \beta + 1)$.

C. $(\alpha + \beta)(\alpha - \beta - 1)$.

D. $(\alpha - \beta)(\alpha - \beta - 1)$.

Exam Reference
HKDSE 2022 (Paper 2) Q1

12. $h^2 - k^2 - 3h - 3k =$

A. $(h + k)(h - k + 3)$.

B. $(h + k)(h - k - 3)$.

C. $(h - k)(h + k + 3)$.

D. $(h - k)(h + k - 3)$.

Exam Reference
HKDSE 2014 (Paper 2) Q2

13. $p^2 - 2p - 4q^2 + 4q =$

A. $(p + 2q)(p - 2q - 2)$.

B. $(p + 2q)(p - 2q + 2)$.

C. $(p - 2q)(p + 2q - 2)$.

D. $(p - 2q)(p + 2q + 2)$.

Exam Reference
HKDSE 2018 (Paper 2) Q3

14. $9 - (4x - 5y)^2 =$

A. $(3 + 4x + 5y)(3 - 4x - 5y)$.

B. $(3 + 4x + 5y)(3 - 4x + 5y)$.

C. $(3 + 4x - 5y)(3 - 4x - 5y)$.

D. $(3 + 4x - 5y)(3 - 4x + 5y)$.

Exam Reference
HKDSE 2016 (Paper 2) Q3

15. $3m^2 + 7mn + 4n^2 - m - n =$

A. $(m - n)(3m - 4n + 1)$.

B. $(m - n)(3m + 4n + 1)$.

C. $(m + n)(3m - 4n - 1)$.

D. $(m + n)(3m + 4n - 1)$.

Exam Reference
HKDSE 2023 (Paper 2) Q4