

HKDSE Exam Series —

Master 1, Tackle 5

Hot Question Types For Mathematics
(Compulsory Part)

New Syllabus Edition

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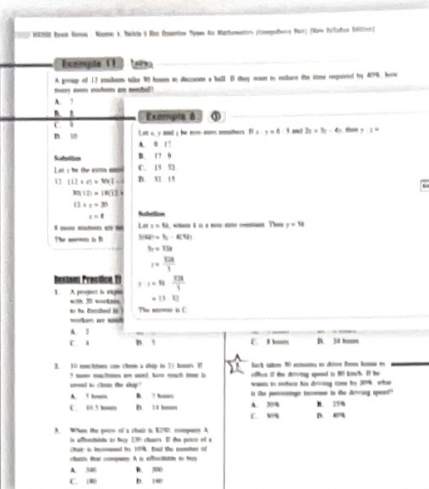
Easy as ABC * Effort Makes Success * Pass with Flying Colours * Relax and Study Further



Special Features

Examples

demonstrate problem solving skills and steps for answering common exam-typed questions in paper 1 and paper 2. Examples marked with ③ and ④ icons are for level 3 and level 4 achievers respectively. MC questions with low rate of correct answers are marked with . New question types under the new syllabus are marked with .



Reference

clearly lists out questions of similar type in the HKDSE papers.

Instant Practice

gives 3 – 6 questions for each example to help candidates familiar with the skill just learned. The advanced questions are marked with .

Solving Strategy

provided on the side of examples suggest problem solving strategies and tips on scoring marks to help candidates answer questions effectively.

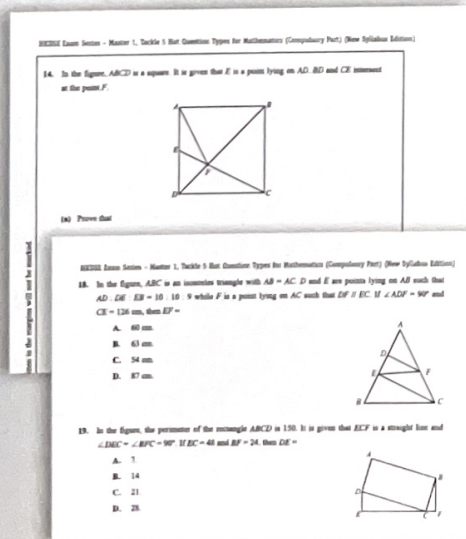
MC Shortcut

suggests shortcut to answer multiple-choice questions and enhance the effectiveness and confidence of candidates.

For some questions, there are online **Learning Videos** and **3-D Figures** drawn by GeoGebra. Candidates can access via the QR codes given.

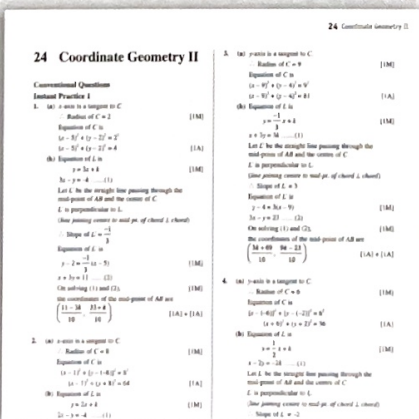
Mock Exam

are provided for final revision before HKDSE.



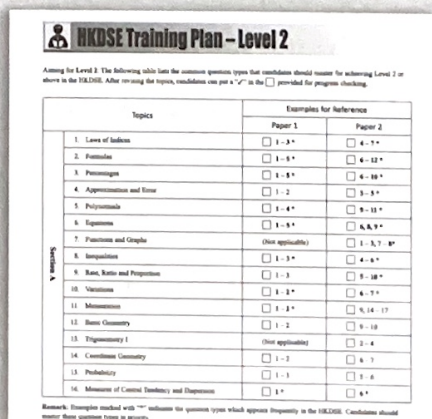
Solution Guide

(access via QR codes) clearly shows the detailed steps and marking scheme of each question.



HKDSE Training Plan

provides a clear goal for candidates and increase the effectiveness on revision.



Content

Section A

1. Laws of Indices
2. Formulas
3. Percentages
4. Approximation and Error
5. Polynomials
6. Equations
7. Functions and Graphs
8. Inequalities
9. Rate, Ratio and Proportion
10. Variations
11. Mensuration
12. Basic Geometry
13. Trigonometry I
14. Coordinate Geometry
15. Probability
16. Measures of Central Tendency and Dispersion

Section B

17. More about Polynomials
18. Numbers and Logarithms
19. Sequences
20. More about Quadratic Equations
21. Transformations of Functions
22. More about Inequalities and Linear Programming
23. Basic Properties of Circles
24. Coordinate Geometry II
25. Trigonometry II
26. More about Probability
27. More about Statistics

Mock Exam

HKDSE Training Plan

Answers

QR Codes for Solution Guide

I

Laws of Indices

Conventional Questions

Section A(1)

Example 1

③

Simplify $(\alpha^2\beta)(\alpha\beta^{-3})^5$ and express your answer with positive indices.

(3 marks)

Reference: HKDSE 21 I Q1

Solution

$$\begin{aligned} & (\alpha^2\beta)(\alpha\beta^{-3})^5 \\ &= (\alpha^2\beta)(\alpha^5\beta^{-15}) && [1M] \\ &= \alpha^7\beta^{-14} && [1M] \\ &= \frac{\alpha^7}{\beta^{14}} && [1A] \end{aligned}$$

Instant Practice 1

Simplify each of the following and express your answers with positive indices.

1. $(\alpha^2\beta^{-3})(\alpha^{-1}\beta^2)^4$ (3 marks)
2. $(x^{-2}y)(xy^{-2})^7$ (3 marks)
3. $\frac{1}{(c^2d^3)(d^{-7}c)^4}$ (3 marks)
4. $\frac{1}{(x^4y^8)(x^{-3}y^{-1})^4}$ (3 marks)
5. $\frac{xy^2}{(x^3y^{-2})(x^4y^{-2})^3}$ (3 marks)

Example 2

3

Simplify $\frac{(x^5y^{-2})^3}{y^4}$ and express your answer with positive indices.

Reference: HKDSE 20 I Q1

Reference: HKDSE 15 I Q1

Reference: HKDSE 14 I Q1

(3 marks)

Solution

$$\begin{aligned}\frac{(x^5y^{-2})^3}{y^4} &= \frac{x^{15}y^{-6}}{y^4} \\ &= \frac{x^{15}}{y^{4-(-6)}} \\ &= \frac{x^{15}}{y^{10}}\end{aligned}$$

[1M]

[1M]

[1A]

Instant Practice 2

Simplify each of the following and express your answers with positive indices.

1. $\frac{(x^{-2}y^5)^3}{x^4}$

(3 marks)

2. $\frac{(x^{-1}y^{-2})^3}{x^{-5}}$

(3 marks)

3. $\frac{m^3}{(mn^{-3})^2}$

(3 marks)

4. $\frac{p^{-9}}{(p^3q^{-2})^5}$

(3 marks)

5. $\frac{p^{-3}}{(p^{-1}q^3)^{-2}}$

(3 marks)

Example 3

③

Simplify $\frac{a^{10}b^8}{(a^2b^{-3})^4}$ and express your answer with positive indices.

(3 marks)

Reference: HKDSE 23 I Q2

Reference: HKDSE 22 I Q1

Reference: HKDSE 18 I Q2

Reference: HKDSE 17 I Q2

Reference: HKDSE 16 I Q1

Solution

$$\begin{aligned}\frac{a^{10}b^8}{(a^2b^{-3})^4} &= \frac{a^{10}b^8}{a^8b^{-12}} && [1M] \\ &= a^{10-8}b^{8-(-12)} && [1M] \\ &= \underline{a^2b^{20}} && [1A]\end{aligned}$$

Instant Practice 3

Simplify each of the following and express your answers with positive indices.

1. $\frac{m^2n^6}{(m^5n^{-2})^3}$ (3 marks)

2. $\frac{m^{-3}n^6}{(m^5n^{-2})^{-3}}$ (3 marks)

3. $\frac{(x^3y^{-1})^2}{x^7y^{-6}}$ (3 marks)

4. $\frac{(mn^{-5})^2}{(m^{-3})^4}$ (3 marks)

5. $\frac{(xy^{-4})^{-3}}{(x^4y^{-2})^5}$ (3 marks)

Multiple-choice Questions

Section A

Example 4



$$\frac{(5x^3)^4}{25x^{10}} =$$

- A. $\frac{x^2}{5}$.
- B. $\frac{4x^2}{5}$.
- C. $25x^2$.
- D. $\frac{25}{x^7}$.

Solution

$$\begin{aligned}\frac{(5x^3)^4}{25x^{10}} &= \frac{5^4 x^{12}}{5^2 x^{10}} \\ &= 5^2 x^2 \\ &= 25x^2\end{aligned}$$

The answer is C.

Reference: HKDSE 20 II Q1

Reference: HKDSE 19 II Q2

MC Shortcut

Strategy – Substituting Values into Unknowns

Substitute $x = 2$ into the expression and use a calculator to find the correct option.

Instant Practice 4

1. $\frac{(2x^5)^3}{6x^7} =$

- A. x .
- B. $\frac{4x}{3}$.
- C. x^8 .
- D. $\frac{4x^8}{3}$.

2. $\frac{(2^2 x^5)^3}{16x^{-2}} =$

- A. $4x^{17}$.
- B. $4x^{10}$.
- C. $2x^{17}$.
- D. $2x^{10}$.

3. $\frac{9x^6}{(3x^2)^4} =$

- A. $\frac{3}{4}$.
- B. $\frac{x^2}{9}$.
- C. $\frac{1}{9x^2}$.
- D. $\frac{3}{x^2}$.

4. $\frac{(5x^2)^{-3}}{5x^{-7}} =$

- A. $25x$.
- B. $\frac{x}{625}$.
- C. $\frac{1}{125x}$.
- D. $\frac{1}{625x}$.

5. $\frac{(3x^{-7})^2}{27x^9} =$

- A. $\frac{2}{9x^{23}}$.
- B. $\frac{2}{9x^5}$.
- C. $\frac{1}{3x^{23}}$.
- D. $\frac{1}{3x^5}$.