

《初中數學與生活》

電子課本使用簡介（教師版）

	畫面	說明
通過瀏覽器登入電子課本		
1		<p>➤ 登入 UPEP iCentre (https://icentre.upephk.com)</p>
2		<p>➤ 登入後，點擊「培進電子書架（網頁版）」開始使用</p>

通過應用程式 (App) 登入電子課本

1



➤ 登入 UPEP iCentre
(<https://icentre.upephk.com>)

2



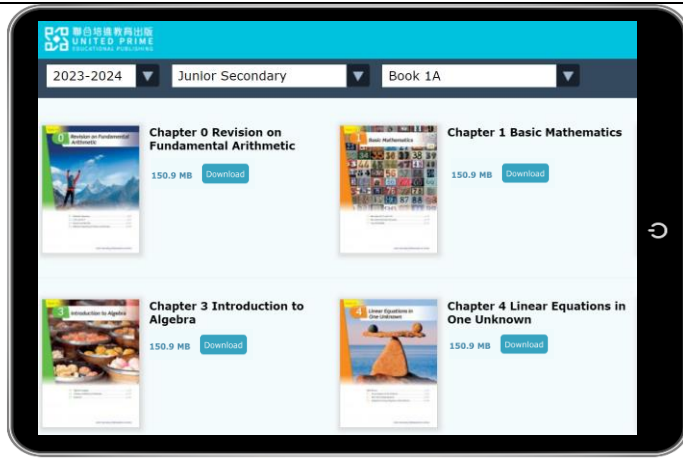
➤ 登入後，點擊「培進電子書架 (APP 版)」

3



➤ 下載及安裝應用程式 (必須使用平板電腦下載)

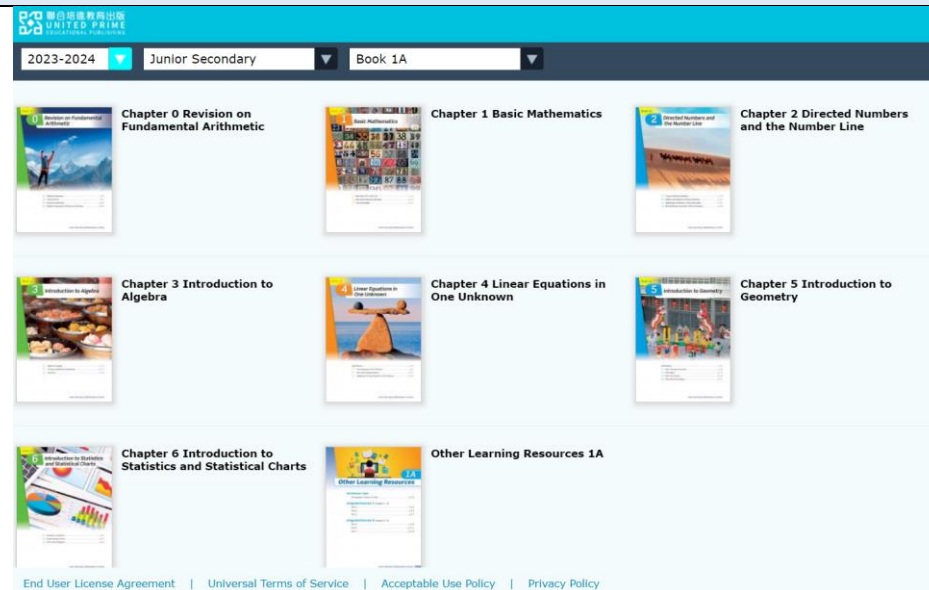
4



- 下載應用程式後，可以在平板電腦上選擇並下載適當的冊次使用

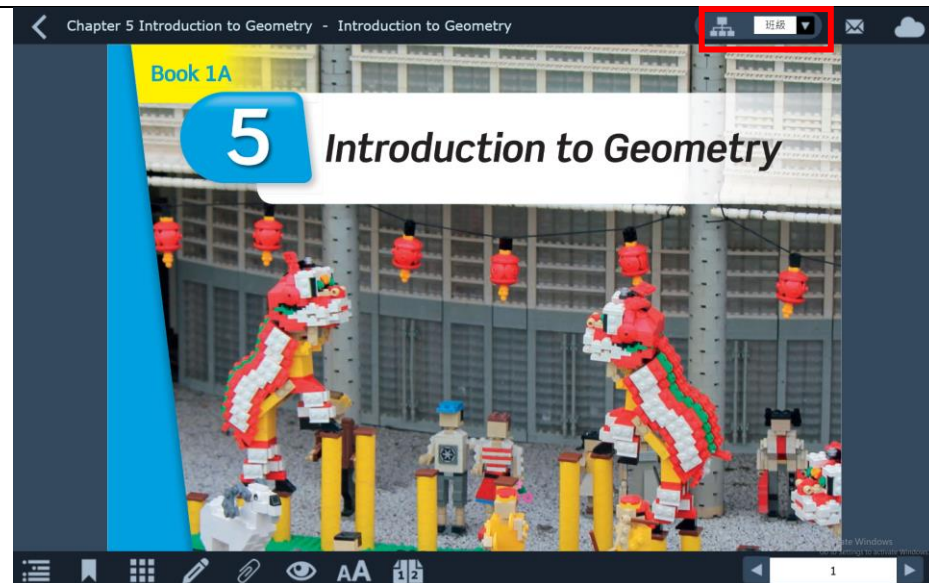
電子課本線上使用流程

1

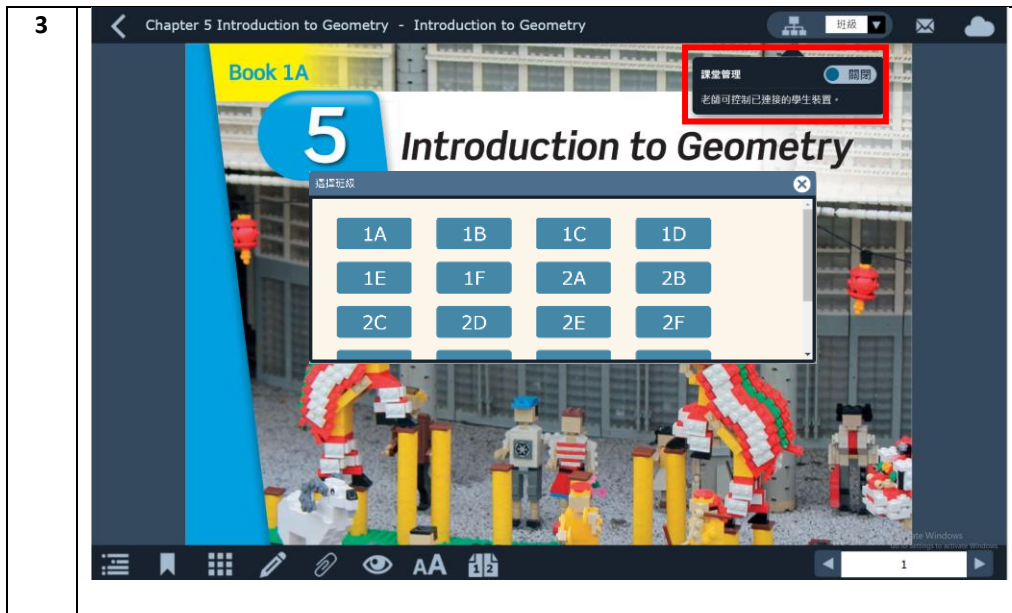


- 各冊電子課本一覽無遺
- 揀選所需冊次和課次，即可進入

2



- 點擊課堂管理功能，連接學生的平板電腦



➤ 點擊「關閉」轉成「開啟」開始管理課堂，然後選擇班別



➤ 課堂管理功能包括：
揭頁：
 老師可將已連接的學生電子課本翻至指定書頁
鎖定書頁：
 老師可鎖定已連接的學生電子課本書頁
黑屏：
 老師可切換已連接的學生電子課本畫面至黑屏



➤ 點擊可查看連線狀態

<p>6</p>		<p>➤ 點擊即可連接至不同教學工具，例如專用網站、i 教學工具及繪圖工具等等</p>																				
<p>7</p>	 <table border="1" data-bbox="186 693 454 1081"> <thead> <tr> <th>Chapter</th> <th>Page</th> </tr> </thead> <tbody> <tr> <td>Introduction to Geometry</td> <td>1</td> </tr> <tr> <td>Lego</td> <td>2</td> </tr> <tr> <td>Quick Review</td> <td>3</td> </tr> <tr> <td>5.1 Basic Concepts in Geome...</td> <td>6</td> </tr> <tr> <td>5.2 Plane Figures</td> <td>17</td> </tr> <tr> <td>5.3 Basic Constuction</td> <td>29</td> </tr> <tr> <td>5.4 Three-Dimensional Figures</td> <td>37</td> </tr> <tr> <td>Chapter Summary</td> <td>53</td> </tr> <tr> <td>Check yourself</td> <td>57</td> </tr> </tbody> </table>	Chapter	Page	Introduction to Geometry	1	Lego	2	Quick Review	3	5.1 Basic Concepts in Geome...	6	5.2 Plane Figures	17	5.3 Basic Constuction	29	5.4 Three-Dimensional Figures	37	Chapter Summary	53	Check yourself	57	<p>➤ 按左下方開啟目錄頁</p>
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9 Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Measures, Shape and Space

5.1 Basic Concepts in Geometry

Geometry is an important *branch* of Mathematics. The fundamental elements of Geometry include points, lines and surfaces. In this chapter, we will learn some basic concepts in Geometry.

A Points, Lines and Surfaces

Points

In daily life, many things appear as **points**, such as a full stop, the tip of a pencil or the needle point of a pair of compasses.

In Geometry, we use a point to represent a position in space. A point has no size. Usually, we use \bullet or a small cross 'x' to represent a point and use a capital letter to label it. For example, we can represent points *A* and *B* as follows:

Lines

A **line** is made up of an infinite number of points. It has no thickness

Interesting Maths
Lines in daily life

6

- 可拖曳頁面，觀看下半頁
- 於右下方輸入頁數，可轉換至其他頁面

10 Chapter 5 Introduction to Geometry - Introduction to Geometry

Quick Review p. 5.3

- 5.1 Basic Concepts in Geometry p. 5.6
- 5.2 Plane Figures p. 5.17
- 5.3 Basic Constructions p. 5.29
- 5.4 Three-Dimensional Figures p. 5.37

Bridging Highlight

In the primary level, students learn to

- recognize the unit degree ($^{\circ}$) of an angle;
- draw angles of given sizes.

Digital Resources Overview

Junior Secondary Mathematics in Action

1

- 點擊顯示教學資訊 (Bridging Highlight)，方便備課

11 Chapter 5 Introduction to Geometry - Introduction to Geometry

5 Introduction to Geometry

Quick Review

5.1 Basic Concepts in Geometry p. 5.6

5.2 Plane Figures p. 5.17

5.3 Basic Constructions p. 5.29

5.4 Three-Dimensional Figures p. 5.37

Full Solutions

85

1

- 點擊開啟練習詳解 (Full Solutions)
- 提供 PDF 檔，可在 PC 和 iPad 直接開啟

Chapter 5 Introduction to Geometry - Introduction to Geometry

Digital Resources Overview

1A Chapter 5

6 Minute Lecture

Name	Page
Points, Lines and Planes	p. 5.3
Angles	p. 5.6
Vertical Angles and Supplementary Angles	p. 5.17
Parallel Lines	p. 5.29
Area and Perimeter of Polygons	p. 5.37

Demo Video

Name	Page
Construction of Parallel Lines	p. 5.29
Construction of Perpendicular Lines	p. 5.29
Construction of Angles	p. 5.29
Construction of Similar Figures	p. 5.37

Digital Resources Overview

Junior Secondary Mathematics in Action

➤ 點擊下載電子課本資源總覽表 (Digital Resources Overview) 以檢視電子資源分佈

Chapter 5 Introduction to Geometry - Introduction to Geometry

Explanation of icons used in e-Textbook

For students and teachers:

- Video**: Provide various types of videos for learning concepts, showing how to solve worked examples and demonstrating working steps in the activities.
- Online Assessment**: Provide online assessment which can be used before class, in class and after class.
- Common Mistake / Exam Advice / Solving Guide**: Help students avoid making common mistakes, and provide advices or guiding for students to solve the questions.
- e-tutor**: Provide the solving guideline for some selected questions.
- Translation Aid**: Provide Chinese translations of some selected questions.

For teachers:

- Digital Resources Overview**: List out all the digital resources in the whole chapter.
- Teaching Schedule**: Summarize information like time ratio, teaching objectives and teaching guides of each section.

Icon list

➤ 到 Icon List 檢視電子課本圖示解說

Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Measures, Shape and Space

Teaching Schedule for Chapter 5 - Introduction to Geometry

Week	Topic	Learning Objectives	Teaching Aids	Assessment	ET Teaching	Classwork	Class Discussion	Exercise
1	Points, Lines and Planes	Understand the concepts of point, line and plane. Understand the properties of a line and a plane. Understand the relationship between a point, a line and a plane.	Real-life examples of points, lines and planes. Diagrams of points, lines and planes.	Formative Assessment: Questionnaire, Class Discussion, Classwork, Exercise.	Classroom Discussion, Classwork, Exercise.	Classwork, Exercise.	Class Discussion, Classwork, Exercise.	Exercise 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37, 5.38, 5.39, 5.40, 5.41, 5.42, 5.43, 5.44, 5.45, 5.46, 5.47, 5.48, 5.49, 5.50, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.63, 5.64, 5.65, 5.66, 5.67, 5.68, 5.69, 5.70, 5.71, 5.72, 5.73, 5.74, 5.75, 5.76, 5.77, 5.78, 5.79, 5.80, 5.81, 5.82, 5.83, 5.84, 5.85, 5.86, 5.87, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.94, 5.95, 5.96, 5.97, 5.98, 5.99, 6.00.
2	Angles	Understand the concepts of angle, acute angle, obtuse angle, straight angle, reflex angle, complementary angles, supplementary angles. Understand the properties of angles. Understand the relationship between angles.	Real-life examples of angles. Diagrams of angles.	Formative Assessment: Questionnaire, Class Discussion, Classwork, Exercise.	Classroom Discussion, Classwork, Exercise.	Classwork, Exercise.	Class Discussion, Classwork, Exercise.	Exercise 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37, 5.38, 5.39, 5.40, 5.41, 5.42, 5.43, 5.44, 5.45, 5.46, 5.47, 5.48, 5.49, 5.50, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.63, 5.64, 5.65, 5.66, 5.67, 5.68, 5.69, 5.70, 5.71, 5.72, 5.73, 5.74, 5.75, 5.76, 5.77, 5.78, 5.79, 5.80, 5.81, 5.82, 5.83, 5.84, 5.85, 5.86, 5.87, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.94, 5.95, 5.96, 5.97, 5.98, 5.99, 6.00.
3	Parallel Lines	Understand the concepts of parallel lines, transversal, corresponding angles, alternate angles, co-interior angles. Understand the properties of parallel lines. Understand the relationship between parallel lines.	Real-life examples of parallel lines. Diagrams of parallel lines.	Formative Assessment: Questionnaire, Class Discussion, Classwork, Exercise.	Classroom Discussion, Classwork, Exercise.	Classwork, Exercise.	Class Discussion, Classwork, Exercise.	Exercise 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37, 5.38, 5.39, 5.40, 5.41, 5.42, 5.43, 5.44, 5.45, 5.46, 5.47, 5.48, 5.49, 5.50, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.63, 5.64, 5.65, 5.66, 5.67, 5.68, 5.69, 5.70, 5.71, 5.72, 5.73, 5.74, 5.75, 5.76, 5.77, 5.78, 5.79, 5.80, 5.81, 5.82, 5.83, 5.84, 5.85, 5.86, 5.87, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.94, 5.95, 5.96, 5.97, 5.98, 5.99, 6.00.
4	Area and Perimeter of Polygons	Understand the concepts of area and perimeter. Understand the properties of area and perimeter. Understand the relationship between area and perimeter.	Real-life examples of area and perimeter. Diagrams of area and perimeter.	Formative Assessment: Questionnaire, Class Discussion, Classwork, Exercise.	Classroom Discussion, Classwork, Exercise.	Classwork, Exercise.	Class Discussion, Classwork, Exercise.	Exercise 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37, 5.38, 5.39, 5.40, 5.41, 5.42, 5.43, 5.44, 5.45, 5.46, 5.47, 5.48, 5.49, 5.50, 5.51, 5.52, 5.53, 5.54, 5.55, 5.56, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.63, 5.64, 5.65, 5.66, 5.67, 5.68, 5.69, 5.70, 5.71, 5.72, 5.73, 5.74, 5.75, 5.76, 5.77, 5.78, 5.79, 5.80, 5.81, 5.82, 5.83, 5.84, 5.85, 5.86, 5.87, 5.88, 5.89, 5.90, 5.91, 5.92, 5.93, 5.94, 5.95, 5.96, 5.97, 5.98, 5.99, 6.00.

A line is made up of an infinite number of points. It has no thickness.

➤ 點擊教學進度表 (Teaching Schedule), 方便備課

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Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Measures, Shape and Space

5.1 Basic Concepts in Geometry

Mathematics In Action

Book 1A Chapter 5 (Lesson 5.1 - 5.2)

The fundamental concepts of Geometry include points, lines and surfaces. In this chapter, we will learn some basic concepts in Geometry.

Points, Lines and Surfaces

A line is made up of an infinite number of points. It has no thickness.

- 按此顯示 5 分鐘教室簡報 (5-Minute Lecture)，方便老師教學
- 教學簡報 (如 5 分鐘教室) 可在 PC 和 iPad 直接開啟

16

Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Measures, Shape and Space

5.1 Basic Concepts in Geometry

Geometry is an important branch of Mathematics. The fundamental concepts of Geometry include points, lines and surfaces. In this chapter, we will learn some basic concepts in Geometry.

Points, Lines and Surfaces

Points

In daily life, many things appear as points, such as a full stop, the tip of a pencil or the needle point of a pair of compasses.

In Geometry, we use a point to represent a position in space. A point has no size. Usually, we use \bullet or a small cross \times to represent a point and use a capital letter to label it. For example, we can represent points A and B as follows:

Lines

A line is made up of an infinite number of points. It has no thickness.

- 點擊著色詞彙，提供翻譯和發音示範

17

Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Introduction to Geometry

2. In the figure, DBC is a straight line. Use the symbol ' \sphericalangle ' and letters to name the following angles. (The diagram has been done for you as an example.)

$a = \sphericalangle CAB, \sphericalangle BAC$ or $\sphericalangle A$

$b =$ _____

$c =$ _____

$x =$ _____

Common Mistake
Students may wrongly name b and c as $\sphericalangle B$. They should be aware that there are two angles b and c at point B .

Types of Angles

We can classify angles into six types by their sizes as shown in the following table.

Type of angle	Acute angle	Right angle	Obtuse angle	Straight angle	Reflex angle	Round angle
Size	Greater than 0° and less than 90°	90°	Greater than 90° and less than 180°	180°	Greater than 180° and less than 360°	360°

- 點擊顯示常犯錯誤，提示學生

18 Chapter 4 Linear Equations in One Unknown - 4.2 More about Solving Equations

When we solve an equation with fractions, it is better to *eliminate* the denominators first.

For example, $\frac{x}{2} - \frac{x}{3} = 4$ contains different denominators. ◀ Note that $\frac{x}{2} - \frac{x}{3} = \frac{1}{2}x - \frac{1}{3}x$.

To eliminate all denominators, we can multiply both sides by a common multiple of the denominators. So, a simple way is to multiply both sides by the L.C.M. of the denominators.

i.e. $\left(\frac{x}{2} - \frac{x}{3}\right) \times 6 = 4 \times 6$ ◀ Multiply both sides by the L.C.M. of 2 and 3, i.e. 6.

$$\frac{x}{2} \times 6 - \frac{x}{3} \times 6 = 24$$

$$3x - 2x = 24$$

$$x = 24$$

Example 4.8 Solve equations by eliminating denominators

Solve the following equations.

(a) $\frac{x}{2} - \frac{x}{7} = 10$ (b) $\frac{y}{4} + \frac{y-3}{6} = 2$

eliminate 消法 4.17

▶ 播放例題影片 (Example Video) 作課堂預習

19 Chapter 4 Linear Equations in One Unknown - 4.2 More about Solving Equations

When we solve an equation with fractions, it is better to *eliminate* the denominators first.

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$$\frac{x}{2} \times 6 - \frac{x}{3} \times 6 = 24$$

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eliminate 消法 4.17

▶ 課前網上練習，檢視學生的掌握程度

20 Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

Exercise 5A

For Q1, Softco needs

Lev In-Class Exercise 5A

1. Name the marked angle in the following figure.

2.

(d) (e) (f)

▶ 備有課堂即時練習、課後練習及診斷評估，跟進學生的掌握程度

Chapter 5 Introduction to Geometry - 5.1 Basic Concepts in Geometry

x = _____

Types of Angles

We can classify angles into six types by their sizes as shown in the following table.

Type of angle	Acute angle	Right angle	Obtuse angle
Size	Greater than 0° and less than 90°	90°	Greater than 90° and less than 180°
Example			

Note: 1. A symbol is used to denote an angle.
2. The figure shows an angle of 45° . We name it as $\angle ABC$.

For example, the marked angles on the right

- 開啟 i 教學工具 (i Teaching Tool)，講解抽象概念
- 無須額外安裝 Geogebra 程式

Chapter 5 Introduction to Geometry - 5.2 Plane Figures

Exercise 5B

For Q12, this figure

Translation Aid (Book 1A Ex 5B)

Directions for Q1, 2, 4, 8, 10 - 13 and 20 are as follows:

- The figure shows a circle with centre O . Use a ruler to construct the angle bisector of $\angle AOB$.
- Using a ruler, classify the following triangles according to the lengths of their sides.
- Using a protractor, classify the following triangles according to the size of their angles.
- Draw a square with side length 4 cm.

8. Consider the following triangles:

(a) Which of the triangles is an equilateral triangle?
 (b) Which of the triangles is an isosceles triangle?
 (c) Which of the triangles is a right-angled triangle?

9. Determine whether each of the following sets of angles can be the three interior angles of a triangle.

(a) $30^\circ, 120^\circ, 30^\circ$ (b) $40^\circ, 14^\circ, 20^\circ$ (c) $50^\circ, 50^\circ, 80^\circ$

10. Which of the following figures are convex polygons?

- 合適的題目設有 Translation Aid，提供中英對照

Chapter 5 Introduction to Geometry - 5.3 Basic Construction

Let us learn some proper methods of constructions of lines and plane figures.

A Constructing Parallel Lines and Perpendicular Lines

Constructing Parallel Lines

To construct a line passing through a given point P parallel to a given line AB by using a ruler and a set square, follow the steps below:

- Fix one square edge of the set square against the ruler.
- Slide the set square along the ruler until the other square edge passes through the point P .
- Draw a line through P parallel to AB .

~End~

- 設置數概影片 (Concept Video)、示範影片 (Demo Video) 及數學模型 (Maths Model) 展示抽象概念，學生亦可經課本上的 QR Code 打開影片自學或重溫

Chapter 5 Introduction to Geometry - 5.4 Three-Dimensional Figures

2-D Representations of Simple Solids

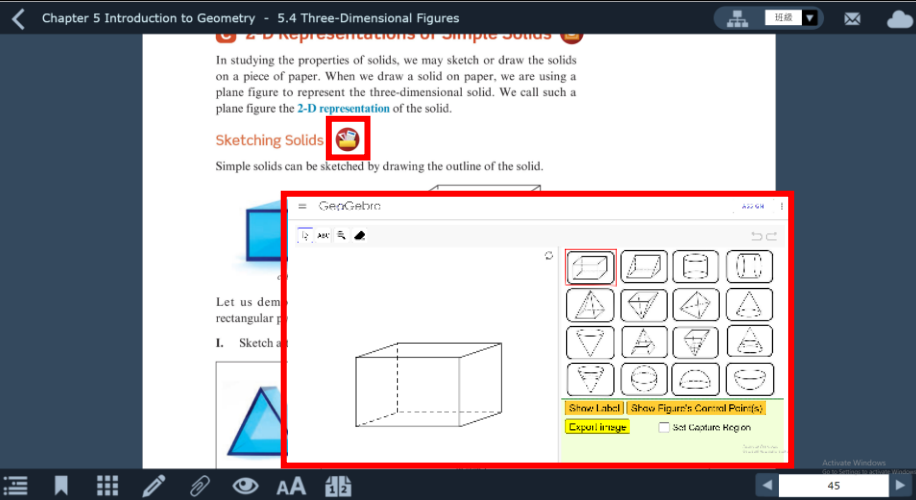
In studying the properties of solids, we may sketch or draw the solids on a piece of paper. When we draw a solid on paper, we are using a plane figure to represent the three-dimensional solid. We call such a plane figure the **2-D representation** of the solid.

Sketching Solids

Simple solids can be sketched by drawing the outline of the solid.

Let us demonstrate how to sketch a rectangular prism.

I. Sketch a rectangular prism.



The screenshot shows the Geogebra interface. A 3D wireframe of a rectangular prism is displayed in the center. To its right is a drawing tool palette with various icons for creating geometric shapes. The palette includes icons for rectangles, triangles, circles, and other polygons. Below the icons are options: 'Show Label', 'Show Figure's Control Point(s)', 'Export Image', and 'Set Capture Region'. The text 'Sketching Solids' and a small icon of a pencil are highlighted with a red box in the original image.

開啟 **Geogebra 繪圖工具 (Drawing Tool)**，輕鬆製作圖像（可用於評估和製作筆記）