

小六數學溫習摘要

Primary 6 Mathematics Revision Summary

6F1 探索與研究

6F1 Exploration and Investigation

把已學公式用來提出可檢查的猜想，設計有次序的比較，再用記錄、反例或推理解釋發現。

Use familiar formulas to pose testable conjectures, organise comparisons and explain findings with records or reasoning.

學習重點

What to learn

- 研究問題要具體，並寫清固定條件及改變條件，讓別人知道你在比較甚麼。
Ask a specific question and state what stays fixed and what changes.
- 計算或量度之前，先寫預測；把各次數據整理成相同欄目的記錄，才容易找出規律。
Make a prediction first and record comparable data fields across trials.
- 觀察到幾個相同結果後，還要嘗試新例子；找到反例便須修訂猜想。
Test new cases after observing a pattern. Revise a conjecture when a counterexample appears.
- 把結果連回數學關係。例如平均速率相同，不代表途中每段的快慢都相同。
Explain results through mathematical relationships; equal overall averages do not determine every stage.

考試前必記

Remember before a test

- 每次比較使用相同單位和同一個 π 近似值，避免把計算方式的差異誤當作規律。
Use consistent units and the same π approximation so methods do not create artificial differences.
- 量度結果可能有誤差；清楚區分實測數據、估計值與按公式計算的值。
Distinguish measured data, estimates and formula-based values.
- 完整說明應包括問題、條件、做法、記錄、結論和理由；例子支持結論，理由解釋為何成立。
Report the question, conditions, method, records, conclusion and reasoning.
- 把「在這些例子中成立」和「在所述條件下一定成立」分開；後者需要充分的推理。
Distinguish a pattern in examples from a claim for every allowed case; the latter needs reasoning.

常見錯誤

Common mistakes

- 只換數字重算，卻沒有說明想研究的關係。
Repeating calculations without a research question.
- 為了配合預測，只保留符合猜想的記錄。
Keeping only observations that support the prediction.
- 把兩個量都增加理解成增加相同倍數，沒有實際比較比例。
Assuming two increasing quantities grow by the same factor.
- 結論比證據涵蓋的範圍更廣，或沒有交代條件。
Claiming more than the evidence supports or omitting conditions.

快速自查

Quick check

☐ 能寫出可研究的問題 I can pose a testable question.	☐ 能記錄條件和比較數據 I can record conditions and comparable results.
☐ 能用反例檢查猜想 I can test conjectures with counterexamples.	☐ 能用公式解釋發現 I can explain patterns using formulas.

自編探究

Original investigation

把圓的半徑加倍，圓周和面積是否也同時加倍？固定使用 $\pi = 3.14$ ，比較半徑 2.5 cm 和 5 cm 的圓。

If a circle's radius doubles, do its circumference and area both double? Use $\pi = 3.14$ throughout and compare circles with radii of 2.5 cm and 5 cm.

記錄與解釋：半徑 2.5：圓周 15.7 cm，面積 19.625 cm²。半徑 5：圓周 31.4 cm，面積 78.5 cm²。圓周變 2 倍，面積變 4 倍。

Records and explanation: Radius 2.5 cm: circumference 15.7 cm, area 19.625 cm². Radius 5 cm: circumference 31.4 cm, area 78.5 cm². Circumference doubles; area becomes four times as large.

為甚麼： $C = 2\pi r$ 只含一次半徑因數； $A = \pi \times r \times r$ 含兩次。半徑乘 2，面積便乘 2×2 。

Why: $C = 2\pi r$ contains the radius as a factor once; $A = \pi \times r \times r$ contains it twice. Multiplying the radius by 2 multiplies the area by 2×2 .

再試與答案：若半徑乘 3 呢？答案：圓周乘 3，面積乘 9。用另一對半徑計算檢查，再按公式說明。

Further practice and answer: What if the radius is multiplied by 3? Answer: circumference is multiplied by 3 and area by 9. Check with another pair of radii, then explain using the formulas.