

3.1.99 Independent transfer: Foundation then Higher

Name: _____ Class: _____ Date: _____

KEY WORDS scale • recurrence relation

<!-- Session 2 independent transfer -->

Objective

Apply this topic to unfamiliar Foundation and Higher problems; keep the two scopes distinct. Original questions and local marking guidance.

1 Key knowledge and worked examples

A map scale compares like units. Convert real distance and time before dividing for speed. Repeated interest uses a recurrence, and the position of each deposit in the recurrence records when it earns interest. Check a recurrence by writing the first two years explicitly.

At 1:25,000, 4 cm represents 100,000 cm=1000 m=1 km. A real 1.5 km path is 150,000 cm, so it measures $150,000/25,000=6$ cm on the map. A room 6 m by 4 m drawn at 1:100 becomes 6 cm by 4 cm because each metre is 100 cm. Its drawing diagonal is $\sqrt{(6^2+4^2)}\approx 7.21$ cm and the real diagonal is about 7.21 m. Enlarging the printed map changes its numerical scale: doubling drawing lengths halves the scale denominator. A scale bar printed with the map enlarges with it.

With $B_0=1000$ and $B_{n+1}=1.1B_n+50$, $B_1=1150$, $B_2=1315$ and $B_3=1496.5$. The balance first exceeds 1400 after three years because $1315\leq 1400<1496.5$. If the deposit preceded interest, $B_1=1.1\times 1050=1155$, five yuan greater. A decay-and-top-up rule $V_{\text{next}}=0.8V+20$, starting at 200, gives 180 then 164. A fixed point satisfies $V=0.8V+20$, hence $V=100$; values above 100 decrease toward it. A fixed point is a value preserved by the update, not a claim that every finite step reaches it exactly.

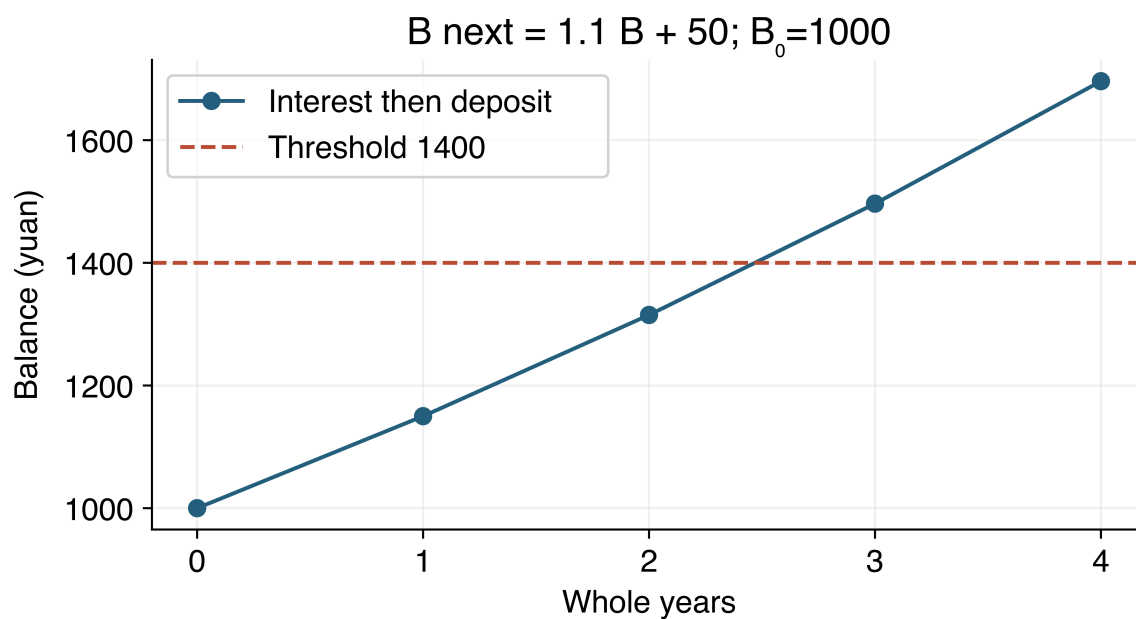
Match units before applying the scale

4 cm on map



1 km on ground at 1:25,000

Prerequisite example; use the transfer task's own data.



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2 Practice

2.1 Foundation: A 1:25000 map shows a road as 6.4 cm. Find its real length in kilometres. A cyclist travels it in eight minutes. Find average speed in kilometres per hour, showing the unit conversion.

3 Exam-style questions

3.1 Higher: A savings account starts at 1000 CNY. Each year it receives 5% interest, then a 100 CNY deposit. Write a recurrence and find the balance after two years. Compare with depositing before interest each year, explaining the difference.
