

C1.13 Percentages

Name: _____ Class: _____ Date: _____

Total: 20 marks

KEY WORDS interest 利息 • simple interest 单利 • compound interest 复利 • multiplier 乘数
 • percentage 百分比

Objective

Use percentages to solve Core IGCSE Mathematics problems.

You must be able to:

- Calculate percentage changes and interpret their base quantities
- Use simple and compound interest correctly
- Compare successive percentage changes

1 Key knowledge and worked examples

■ Key knowledge: Percentages

To find a percentage, multiply by $p/100$. To express one amount as a percentage of another, divide by the comparison amount then multiply by 100. Percentage change uses the original amount as denominator. An increase of $r\%$ uses multiplier $1 + r/100$; a decrease uses $1 - r/100$. Simple interest is $I = Prt/100$; compound interest uses $A = P(1 + r/100)^n$.

■ Worked example: Percentages

year 0: 800	year 1: 840	year 2: 882
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Invest 800 yuan at 5% per year for two years.

- Simple interest: $I = Prt/100 = 800(5)(2)/100 = 80$ yuan; total $A = P + I = 880$ yuan.
- Compound total: $A = P(1 + r/100)^n = 800(1.05)^2 = 882$ yuan.
- The second compound year earns interest on the first year's interest too.

■ Method check

Successive percentages act on the current amount. Equal percentage increases and decreases therefore need not cancel.

2 Practice

2.1 Find 18% of 250 yuan. [2]

2.2 Express 42 as a percentage of 60. [2]

2.3 A price falls from 80 to 68 yuan. Find the percentage decrease. [2]

2.4 An item costs 160 yuan to buy and sells for 200 yuan. Find the profit percentage on cost. [2]

3 Exam-style questions

3.1 Apply the percentages methods below. Show working and include units where appropriate.

- (a) A 1200-yuan bicycle is discounted by 15%. Find its sale price. [2]

- (b) The buyer pays a deposit of 30% of the sale price. Find the deposit. [2]

- (c) Instead, 1200 yuan earns 4% compound interest for two years. Find the interest earned. [2]

3.2 A bicycle costs 800 yuan. Its price rises by 10% and the new price is then reduced by 10%.

- (a) Find the final price and the overall percentage change from the original price. [3]

- (b) Compare the interest on 800 yuan after two years at 5% per year under simple interest and annual compound interest. [3]
