1.3 FDP operators, percentage change and compound interest

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS recurring decimal • compound interest formula

FDP operators, percentage change and compound interest

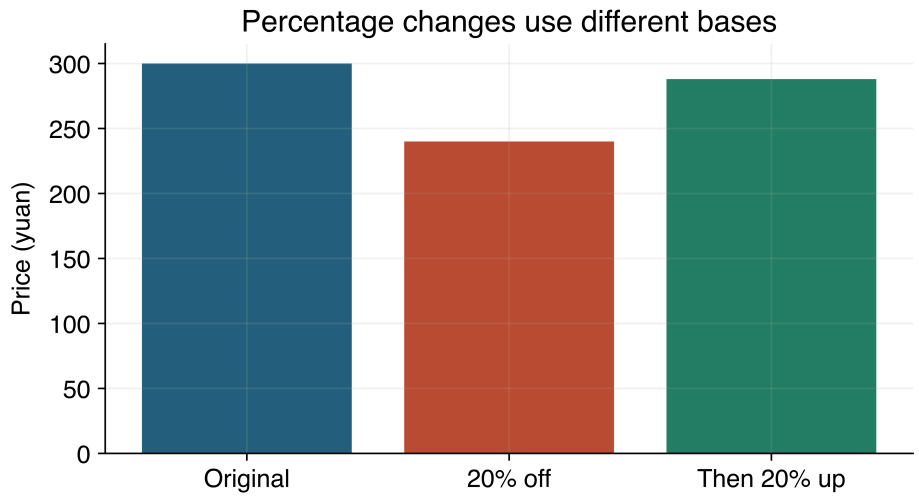
Objective

Use fractions, decimals and percentages as operators; express one quantity as a fraction/percentage of another; convert recurring decimals; solve percentage-change problems including reverse percentage and the compound interest formula (rows N12–N15 with the Extension additions).

1 Key knowledge and worked examples

Operators. 35% of 240 = 84; $\frac{3}{5}$ of a quantity multiplies by 3 then divides by 5; 7 as a percentage of 28 is 25%. Recurring decimals (specification original, not sampled): $0.\overline{45} = \frac{45}{99} = \frac{5}{11}$ by shift-and-subtract.

Percentage change. Multipliers: +12% is ×1.12, −17% is ×0.83. Reverse percentage divides (a £92 price after a 15% increase means £80 originally). Compound interest (specification original, not sampled): $A = P\left(1 + \frac{r}{100}\right)^n$ – £2000 at 3% for 4 years gives $2000 \times 1.03^4 =$ £2251.02.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 Find 35% of 240 [2]

2.2 Find $\frac{3}{5}$ of 85 [2]

2.3 Express 7 as a percentage of 28 [2]

2.4 Convert $0.\overline{45}$ to a fraction [3]

2.5 Increase 65 by 20% [2]

3 Exam-style questions

3.1 *(Original, specification line not sampled: reverse percentage.)* After a 15% increase a jumper costs £92. Find the original price. [3]

3.2 *(Original, specification line not sampled: compound interest formula.)* £2000 is invested at 3% compound interest. (a) Find the value after 4 years. (b) Find the interest earned. [4]

3.3 *(Original.)* A car worth £12000 depreciates 20% per year. Its value first falls below £2500 during which year? (Use logarithms or trial and improvement.) [4]

Solutions

2.1 84.

2.2 51.

2.3 25%.

2.4 $x = 0.\overline{45}$: $100x = 45.\overline{45}$, so $99x = 45$ and $x = \frac{45}{99} = \frac{5}{11}$.

2.5 $65 \times 1.2 = 78$.

3.1 $92 \div 1.15 = £80$.

3.2 (a) $2000 \times 1.03^4 = £2251.02$. (b) £251.02.

3.3 $V = 12000 \times 0.8^t < 2500$ needs $0.8^t < 0.2083$, so $t > \ln 0.2083 / \ln 0.8 \approx 7.0$: during the 8th year.

Local review guidance: the multiplier stated before use; money to 2 d.p.; reverse-percentage answers found by division. This is authored classroom guidance.