

E1.13 Percentages

Name: _____ Class: _____ Date: _____ **Total: 13 marks**

KEY WORDS percentage 百分比 • percentage increase 百分比增加
• percentage decrease 百分比减少 • reverse percentage 逆百分比 • multiplier 乘数

Objective

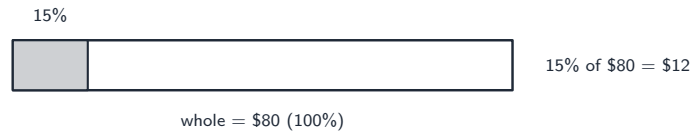
Build the skills to answer Extended exam questions on **percentages** 百分比 — finding a **percentage of a quantity** 某数的百分比, writing one quantity as a **percentage of another** 占比, calculating **percentage increase and decrease** 百分比增减, and working backwards in a **reverse percentage** 逆百分比 problem.

You must be able to:

- find a percentage of a quantity, and write one quantity as a percentage of another
- calculate a percentage increase or decrease using a multiplier
- find the original amount after a percentage change has already been applied

1 Worked examples

■ One multiplier does an increase, a decrease, and the way back



A percentage is a part of 100 — the bar makes that visible

- **Percentage of:** 15% of 240 = $0.15 \times 240 = 36$.
- **One as a percentage of another:** 18 out of 45 = $\frac{18}{45} \times 100 = 40\%$.
- **Increase or decrease:** a rise of 12% is $\times 1.12$; a fall of 12% is $\times 0.88$. So 60 increased by 12% is 67.2.
- **Reverse percentage — DIVIDE:** if a price is \$96 **after** a 20% rise, the original was $96 \div 1.2 = \$80$. Taking 20% off \$96 gives \$76.80, which is wrong.

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the

correct answer): the multiplier, or the fraction before it is turned into a percentage, is the method mark.

2 Practice

2.1 Find 35% of 280. [1]

2.2 Write 21 as a percentage of 60. [2]

2.3 Increase 85 by 6%. [2]

2.4 A price falls from \$80 to \$68. Calculate the percentage decrease. [2]

3 Exam-style questions

3.1 In a sale, all prices are reduced by 30%. A coat costs \$84 in the sale.

(a) Calculate the original price of the coat. [3]

(b) Calculate the amount saved. [1]

3.2 The population of a town rises from 24 500 to 26 215. Calculate the percentage increase. ^[2]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- 0.35×280
 $= \mathbf{98}$

2.2

- $\frac{21}{60} \times 100$
 $= \mathbf{35\%}$

2.3

- a rise of 6% gives a multiplier of 1.06, so 85×1.06
 $= \mathbf{90.1}$

2.4

- the fall is $80 - 68 = 12$, and the denominator is the ORIGINAL, 80
 $\frac{12}{80} \times 100 = \mathbf{15\%}$

3.1

(a)

- the sale price is 70% of the original, so the multiplier is 0.7
- original $= 84 \div 0.7$
 $= \mathbf{\$120}$

(b)

- $120 - 84$
 $= \mathbf{\$36}$

3.2

- the increase is $26\,215 - 24\,500 = 1715$
 $\frac{1715}{24\,500} \times 100 = \mathbf{7\%}$