

Exercise walk-through

3.2.1

Percent

AQA · GCSE · Mathematics

50. Length, area and volume scale factors · Higher

Length, area and volume scale factors · Higher

Enlarging a box from $2 \times 3 \times 4$ to $6 \times 9 \times 12$ multiplies lengths by 3. Its volume changes from 24 to 648, a factor of 27; a 2×3 face changes area from 6 to 54, a factor of 9. Length ratio 2:5 corresponds to area ratio 4:25 and volume ratio 8:125. If similar shapes have areas 20 and 80 cm^2 , the larger-to-smaller length factor is $\sqrt{(80/20)}=2$. If similar solids have volumes 16 and 128 cm^3 , $k=\sqrt[3]{8}=2$. Higher: triangles with the same acute angle have equal opposite/hypotenuse ratios; doubling both lengths leaves $\sin\theta$ unchanged.

54. Simple interest, compound growth and decay · Foundation

Simple interest, compound growth and decay · Foundation

A percentage r corresponds to decimal $r/100$; increases use multiplier $1+r/100$ and decreases $1-r/100$. Simple interest on principal P for n periods at rate r is $P rn/100$, giving balance $P(1+rn/100)$. Compound balance is $P(1+r/100)^n$. Decay uses the corresponding decreasing multiplier. Use matching rate and period units, and divide by the multiplier to recover an original value.

56. Simple interest, compound growth and decay · Foundation

Simple interest, compound growth and decay · Foundation

At 10% per year, 1000 yuan earns simple interest 100 per year: after two years interest is 200 and balance is 1200. Compound balances are 1100 after year one and 1210 after year two. A machine worth 800 yuan losing 20% each year becomes 640 then 512, not 480: the second loss is 20% of 640. An 800-yuan sale price after a 20% reduction corresponds to original price $800/0.8=1000$. Growth from 50 to 65 is $(65-50)/50 \times 100 = 30\%$; 65 is 130% of 50. If a compound balance must first exceed 1300 at 10%, year two gives 1210 and year three 1331, so three whole years are needed.

Exercises 2.1·2.3

2.1 (Foundation) A price of 80 rises by 15%. Find the new price.

2.2 (Foundation) A 25% discount leaves a price of 90. Find the original price.

2.3 (Foundation) Share 84 in the ratio 2:5. Find the larger share.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) A price of 80 rises by 15%. Find the new price.

2.1 Multiply by 1.15: $80 \times 1.15 = 92$.

2.2 (Foundation) A 25% discount leaves a price of 90. Find the original price.

2.2 The sale price is 75% of the original: $90 / 0.75 = 120$.

2.3 (Foundation) Share 84 in the ratio 2:5. Find the larger share.

3 Exam-style questions

2.3 There are seven ratio parts. The larger share is $84 \times 5 / 7 = 60$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A 20% decrease followed by a 20% increase restores the starting price.

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3.1 False. Starting at 100 gives 80 after the decrease and 96 after the increase. The overall multiplier is $0.8 \times 1.2 = 0.96$, a 4% decrease.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.