Ratio, Proportion and Rates of Change

Ratio and proportion · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

$y = kx$ $y = k/x$ speed = distance ÷ time, density = mass ÷ volume

amount = $P \times (1 \pm r/100)^n$

Questions

Show your working in the space under each question.

1. EASY Simplify the ratio 18 : 24.

2. EASY 5 pens cost $3.50. How much do 8 cost?

3. MEDIUM A car travels 150 km in 2.5 hours. Find its average speed.

4. MEDIUM 6 workers take 10 days to build a wall. How long would 4 workers take?

5. HARD A block has density 2.7 g/cm³ and volume 450 cm³. Find its mass.

6. HARD A car worth $12 000 loses 15% of its value each year. Find its value after 2 years, and after how many whole years it is first worth less than half.

Step-by-step answers

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1. Divide both by 6: **3 : 4**.
2. One pen costs 3.50 ÷ 5 = 0.70. Eight cost 8 × 0.70 = **$5.60**.
3. 150 ÷ 2.5 = **60 km/h**.
4. Inverse proportion: the job needs 6 × 10 = 60 worker-days. 60 ÷ 4 = **15 days**.
5. mass = density × volume = 2.7 × 450 = **1215 g**.
6. Multiplier 0.85. After 2 years: 12 000 × 0.85^2 = **$8670**. Half-value needs $0.85^n < 0.5$: $0.85^4 = 0.522$ and $0.85^5 = 0.444$, so after **5 years**.