eClassroom

GCSE Mathematics

Percentage Change & Reverse Percentage

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

$\frac{100-80}{80} \times 100 = \frac{20}{80} \times 100$

∴ **25%**

[Fluency] Question 2

$\frac{150-120}{150} \times 100 = \frac{30}{150} \times 100$

∴ **20%**

[Fluency] Question 3

Multiplier=1.20. Original=84/1.20

∴ **£70**

[Fluency] Question 4

Multiplier=0.85. Original=34/0.85

∴ **£40**

[Fluency] Question 5

$\frac{54-45}{45} \times 100 = \frac{9}{45} \times 100$

∴ **20%**

[Reasoning] Question 6

Net multiplier: 1.40×0.90=1.26

1.26–1=0.26

∴ **26% increase**

[Reasoning] Question 7

Multiplier=0.70. Original=63/0.70

∴ **£90**

[Reasoning] Question 8

Multiplier=1.12. Original=22400/1.12

∴ **20 000**

[Problem Solving] Question 9

$8000 \times (1-r)^2 = 5379.20$

$(1-r)^2 = \frac{5379.20}{8000} = 0.6724$

$1 - r = \sqrt{0.6724} = 0.82 \Rightarrow r = 0.18$

∴ **18% annual depreciation**

[Problem Solving] Question 10

$(a)\ 240000 \times 1.035^4 = 240000 \times 1.1475 = \$275{,}405.52$

Year 1: 248400, Year 2: 256894, Year 3: 265685, Year 4: 274784 <275000

Year 5: 284201 > 275000

∴ **(a) £275 405.52 (b) 5 complete years**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$\frac{|4.8-5.0|}{5.0} \times 100 = \frac{0.2}{5.0} \times 100$

∴ **4%**

[Fluency] Question 2

Original=189/1.35

∴ **£140**

[Reasoning] Question 3

1.10×1.10=1.21

1.21=1+21/100, so equivalent to 21% increase ✓

∴ **21% increase shown ✓**

[Reasoning] Question 4

(a) $(1+\frac{p}{100})(1-\frac{p}{100}) = 1-\frac{p^2}{10000} < 1$ ✓

(b) x=20: 1.20×0.80=0.96 → decrease of 4%

∴ **(a) Always decreases ✓ (b) 4% decrease**

[Reasoning] Question 5

$\text{Original} = \frac{7369.50}{0.85^3} = \frac{7369.50}{0.614125}$

∴ **£12 000**

[Reasoning] Question 6

Original=156/1.20

∴ **£130**

[Problem Solving] Question 7

$5000 \times (1+r)^5 = 6083.26$

$(1+r)^5 = 1.216652 \Rightarrow 1+r = 1.04$

∴ **r = 4%**

[Problem Solving] Question 8

$45000 \times 1.025^n > 55000$

$1.025^n > \frac{55000}{45000} = 1.\overline{2} \approx 1.222$

Testing: n=8: 45000×1.025&sup8;=54704 <55000; n=9: 56199>55000

∴ **After 9 complete years**

[Problem Solving] Question 9

Cost price=399/1.145

∴ **£348.47**

[Problem Solving] Question 10

$(1 + \frac{p}{100})(1 - \frac{p}{100}) = 1 - \frac{p^2}{10000}$

Decrease from 1: p²/10000, as a percentage: p²/100

Example p=30: 1.30×0.70=0.91 → 9% decrease; 30²/100=9% ✓

∴ **Net decrease = p²/100 % ✓**