



KS3.M-R7 Percentage Change and Multipliers

AQA KS3.M-R7 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Write down 10% of 360.

(1)

- 2** A jacket that normally costs 80 pounds is reduced by 25%. Work out the sale price.

(1)

- 3** Find 5% of 240.

(1)

- 4** Increase 150 by 18%. Give your answer to the nearest whole number.

(2)

- 5** Write down the multiplier to decrease an amount by 30%.

(2)

- 6** A school dinner costs 2.40 pounds. Each year the price increases by 5%. Work out the cost after 2 years, correct to the nearest penny.

(3)

- 7** A printer cartridge is reduced by 20% in January and then by a further 10% in February. The original price was 45 pounds. Work out the price after the two reductions, giving your answer to the nearest 10 pence.

(3)

- 8** A coat is on sale for 84 pounds after a 30% reduction. Work out the original price of the coat.

(3)

- 9** An item costs 48 pounds and is later 54 pounds. Work out the percentage change, stating whether it is an increase or a decrease. Give your answer to one decimal place.

(2)

- 10** A phone price is increased by 15% and then decreased by 10%. If the original price was 200 pounds, find the final price. Explain briefly why this final price is not the same as increasing by 5% overall.

(3)

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- 11** Sam buys a bicycle for 150 pounds and sells it to a friend making a 12% profit. The friend then sells the bicycle to another person at a 15% loss on the price they paid. Work out the final selling price to the third person. Give your answer to the nearest penny.

(4)

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- 12** Write down the multiplier to increase an amount by 250%.

(1)

-
- 13** A town's population falls by 6% each year. The current population is 24 000. Work out the population after 3 years, giving your answer to the nearest whole number.

(3)

-
- 14** Express an increase of 40% as a multiplier and as a fractional multiplier.

(2)

- 15** Explain why increasing a number by 20% and then by 30% is not the same as increasing it by 50%. Give a short numerical example to support your explanation.

(2)

-
- 16** A table price including VAT is 240 pounds. The VAT rate is 20% added to the original price. Work out the price before VAT was added.

(3)

-
- 17** A small shop had sales of 12 500 pounds last year. Sales rose by 3% in the first year and by 4% in the second year. Work out the sales after the two years, correct to the nearest pound.

(3)

-
- 18** Stretch question. After two successive percentage changes the final price of an item is 198 pounds. First it was increased by $p\%$ and then decreased by 10%, where p is 20. Work out the original price before the two changes. Show your steps.

(4)

Mark scheme • KS3.M-R7 Percentage Change and Multipliers

Question 1

- **B1** 36 cao
- Answer: **36**

Question 2

- **B1** 60 pounds cao
- Answer: **60 pounds**

Question 3

- **B1** 12 cao
- Answer: **12**

Question 4

- **M1** use of 150×1.18 or calculation of $18\% = 27$ and addition
- **A1** 177 cao
- Answer: **177**

Question 5

- **M1** correct reasoning: $100\% - 30\% = 70\%$ or 0.70
- **A1** 0.7 or 0.70 cao
- Answer: **0.7**

Question 6

- **M1** use of multiplier 1.05 twice or equivalent method
- **M1** correct intermediate value $2.40 \times 1.05 = 2.52$ or evidence of both steps
- **A1** 2.65 (pounds) cao
- Answer: **2.65**

Question 7

- **M1** use of multiplier 0.8 then 0.9 or combined multiplier 0.72
- **M1** calculation $45 \times 0.72 = 32.4$ or equivalent two-step shown
- **A1** 32.4 pounds (or 32.40) cao
- Answer: **32.4**

Question 8

- **M1** recognition that $84 = 70\%$ of original or use $84 / 0.7$
- **M1** division to find original price
- **A1** 120 pounds cao
- Answer: **120 pounds**

Question 9

- **M1** correct method: $(54 - 48)/48 \times 100$ or equivalent
- **A1** 12.5% increase cao
- Answer: **12.5% increase**

Question 10

- **M1** use of multipliers 1.15 and 0.9 or calculation steps shown leading to $200 \times 1.15 \times 0.9$
- **M1** correct final price calculation $200 \times 1.035 = 207$ or equivalent
- **A1** 207 pounds and explanation that successive percentage changes multiply not add, so $1.15 \times 0.9 = 1.035$ not 1.05
- Answer: **207 pounds**

Question 11

- **M1** apply 12% profit: $150 \times 1.12 = 168.00$ or evidence
- **M1** apply 15% loss: 168×0.85 or equivalent
- **M1** correct multiplication $168 \times 0.85 = 142.8$
- **A1** 142.80 pounds cao
- **Answer: 142.80 pounds**

Question 12

- **B1** 3.5 or 3.50 cao ($100\% + 250\% = 350\% = 3.5$)
- **Answer: 3.5**

Question 13

- **M1** use of multiplier 0.94 three times or combined multiplier 0.94^3
- **M1** correct intermediate calculation e.g. $24000 \times 0.94 = 22560$ then further steps
- **A1** 19934 (population) cao
- **Answer: 19934**

Question 14

- **M1** recognition that $100\% + 40\% = 140\%$ giving 1.4
- **A1** 1.4 and $7/5$ cao
- **Answer: 1.4 and 7/5**

Question 15

- **M1** correct statement that multipliers multiply not add ($1.2 \times 1.3 = 1.56$ not 1.5)
- **A1** example such as starting with 100 gives $100 \times 1.2 \times 1.3 = 156$ not 150 cao
- **Answer: Because multipliers multiply: $1.2 \times 1.3 = 1.56$, so 100 -> 156 not 150**

Question 16

- **M1** recognition that $240 = 120\%$ of original or use $240 / 1.2$
- **M1** division to find original price
- **A1** 200 pounds cao
- **Answer: 200 pounds**

Question 17

- **M1** use of multipliers 1.03 then 1.04 or combined 1.03×1.04
- **M1** intermediate calculation $12500 \times 1.03 = 12875$ or similar
- **A1** 13390 pounds cao
- **Answer: 13390**

Question 18

- **M1** use of multiplier for increase $1 + p/100 = 1.20$ and decrease multiplier 0.9 to form equation original $\times 1.20 \times 0.9 = 198$
- **M1** correct combination $1.20 \times 0.9 = 1.08$ or equivalent
- **M1** division to find original: $198 / 1.08$
- **A1** 183.33... rounded to 183.33 cao
- **Answer: 183.33**