3.7 Percentages: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Work out 7% of 350. Give your answer as a decimal number.

(Total for Question 1 is 2 marks)

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2 A jumper costs £40. It is reduced by 25% in a sale. Work out the sale price of the jumper.

(Total for Question 2 is 2 marks)

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3 Increase 120 by 15%. Work out the new value.

(Total for Question 3 is 2 marks)

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4 The population of a village is 1500. Over one year the population increases by 12%.

(a) Work out the population at the end of the year. **(2)**

.....

(Total for Question 4 is 2 marks)

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5 A car is worth £9000. Over one year its value decreases by 8%.

(a) Work out the value of the car at the end of the year. **(2)**

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(Total for Question 5 is 2 marks)

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6 A restaurant bill for food comes to £45. VAT is then added at 20%.

(a) Work out the total cost of the bill including VAT. **(2)**

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(Total for Question 6 is 2 marks)

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7 Increase 160 by 35%.

(Total for Question 7 is 2 marks)

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8 Decrease 90 by 8%.

(Total for Question 8 is 2 marks)

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9 A laptop has a price of £540 before VAT. VAT is charged at 20%. Work out the total price of the laptop including VAT.

(Total for Question 9 is 2 marks)

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10 Kwame puts £1200 into a savings account that pays 2.5% simple interest per year. Work out the total interest he earns after 5 years.

(Total for Question 10 is 2 marks)

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11 A recipe requires 250 g of flour. A baker wants to increase all ingredient quantities by 12.5% to make a larger batch. Work out the new required mass of flour, giving your answer in grams.

(Total for Question 11 is 4 marks)

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12 A shopkeeper buys a bicycle for £120. She sells it for £150.

(a) Work out her percentage profit. **(3)**

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(Total for Question 12 is 3 marks)

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13 Priya has £240. She spends 35% of it on a coat. She then spends 1/4 of what is left on a pair of shoes.

(a) Work out how much money Priya has left. **(4)**

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(Total for Question 13 is 4 marks)

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14 A theatre has 800 seats. For one show, 65% of the seats are sold in advance. On the night of the show, a further 120 seats are sold.

(a) Work out what percentage of the theatre's seats are sold in total. **(3)**

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(Total for Question 14 is 3 marks)

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15 A secondary school has 1200 students. 55% of the students are girls. Of the girls, 40% study French. Work out how many girls study French.

(Total for Question 15 is 3 marks)

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16 A denim jacket is normally priced at £64. In a clearance sale it is reduced to £48. Work out the percentage decrease in the price.

(Total for Question 16 is 3 marks)

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17 After a price increase of 20%, a mountain bike now costs £252. Work out the original price of the bike, before the increase.

(Total for Question 17 is 3 marks)

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18 Daniel buys a second-hand table for £85. He restores it and sells it for £102. Work out his percentage profit.

(Total for Question 18 is 3 marks)

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19 After a 20% increase the price of a radio is £372. Work out the original price of the radio.

(Total for Question 19 is 2 marks)

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20 A jacket costs £120. It is reduced by 25% in a sale and then a further 10% is taken off the reduced price. Work out the final price of the jacket.

(Total for Question 20 is 3 marks)

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21 A school fundraiser collected £840. The organisers decide to give 12% to charity, use 35% for equipment, and split the remainder equally between two sports teams. Work out how much each sports team receives. Show your working.

(Total for Question 21 is 4 marks)

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22 In a sale, all normal prices are reduced by 20%. The sale price of a coat is £68.

(a) Work out the normal price of the coat before the sale. **(3)**

.....

(Total for Question 22 is 3 marks)

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23 Kwame invests £3000 in an account paying 5% compound interest per year.

(a) Work out the value of the investment at the end of 2 years. **(3)**

.....

(Total for Question 23 is 3 marks)

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24 Aisha invests £2500 in an account paying 3% compound interest per year. Work out the value of her investment at the end of 4 years. Give your answer to the nearest penny.

(Total for Question 24 is 3 marks)

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25 Sophie buys a car for £18000. The car depreciates in value by 12% each year. Work out the value of the car after 3 years. Give your answer to the nearest pound.

(Total for Question 25 is 3 marks)

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26 In a sale, a shop reduces every price by 15%. The sale price of a jumper is £39.10. Work out the original price of the jumper, before the sale.

(Total for Question 26 is 3 marks)

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27 The population of a town increases by 8% each year. If the current population is 25 000, work out the population after 2 years. Give your answer to the nearest whole person.

(Total for Question 27 is 3 marks)

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28 A bank offers 6% compound interest per year, compounded annually. Sara invests £2000 for 3 years. Work out the total interest earned after 3 years. Give your answer to the nearest pound.

(Total for Question 28 is 5 marks)

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29 A price of £270 includes VAT at 20%. A shop removes the VAT to find the pre-VAT price, then applies a separate 10% loyalty-card discount to that pre-VAT price.

(a) Work out the price before VAT was added. **(2)**

.....

(b) Work out the final price a loyalty-card customer pays, after the 10% discount is applied to the pre-VAT price. **(2)**

.....

(Total for Question 29 is 4 marks)

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30 A bacteria population starts at 800 and increases by 25% every hour.

(a) Work out the population after 6 hours. Give your answer to 3 significant figures. **(3)**

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(b) Work out the overall percentage increase in the population over the 6 hours. Give your answer to 3 significant figures. **(2)**

.....

(Total for Question 30 is 5 marks)

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31 The price of an item is increased by x%. It is then decreased by x%. The final price is 4% less than the original price.

(Total for Question 31 is 4 marks)

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Mark scheme · 3.7 Percentages: 2-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

use 0.07 x 350 or 7/100 x 350 **M1**
24.5 cao **A1**
Answer: 24.5

Question 2

find 25% of 40 or show 40 x 0.25 or 40/4 **M1**
£30 cao **A1**
Answer: £30

Question 3

find 15% of 120 or show 120 x 0.15 **M1**
138 cao **A1**
Answer: 138

Question 4

(a) 1.12 x 1500 (oe: 12% of 1500 = 180) **M1**
(a) 1680 **A1**
(a) Answer: 1680

Question 5

(a) 0.92 x 9000 (oe: 8% of 9000 = 720) **M1**
(a) 8280 (pounds) **A1**
(a) Answer: £8280

Question 6

(a) 1.2 x 45 (oe: 20% of 45 = 9) **M1**
(a) 54 (pounds) **A1**
(a) Answer: £54

Question 7

1.35 x 160 (oe: 35% of 160 = 56) **M1**
216 **A1**
Answer: 216

Question 8

0.92 x 90 (oe: 8% of 90 = 7.2) **M1**
82.8 **A1**
Answer: 82.8

Question 9

1.2 x 540 (oe: 20% of 540 = 108) **M1**
648 (pounds) **A1**
Answer: £648

Question 10

2.5% of 1200 = 30 (interest for one year) **M1**
150 (pounds), from 30 x 5 **A1**
Answer: £150

Question 11

identify percentage increase and write multiplier 1 + 12.5/100 = 1.125 **M1**
convert 12.5% to fraction 1/8 or show equivalent method **M1**
calculate 250 x 1.125 = 281.25 (method) **M1**
281.25 g cao **A1**
Answer: 281.25 g

Question 12

(a) profit = 150 - 120 = 30 **M1**
(a) 30/120 x 100 (oe) **M1**
(a) 25% **A1**
(a) Answer: 25%

Question 13

(a) 35% of 240 = 84 (coat) **M1**
(a) amount left after coat = 240 - 84 = 156 **M1**
(a) 1/4 of 156 = 39 (shoes) **M1**
(a) 117 (pounds) **A1**
(a) Answer: £117

Question 14

(a) 65% of 800 = 520 **M1**
(a) (520 + 120)/800 x 100 (oe) **M1**
(a) 80% **A1**
(a) Answer: 80%

Question 15

number of girls = 0.55 x 1200 = 660 **M1**
0.40 x 660 (oe) **M1**
264 **A1**
Answer: 264

Question 16

decrease = 64 - 48 = 16 **M1**
16/64 x 100 (oe) **M1**
25% **A1**
Answer: 25%

Question 17

recognises 252 represents 120% (1.2) of the original price **M1**
252 / 1.2 (oe) **M1**
210 (pounds) **A1**
Answer: £210

Question 18

profit = 102 - 85 = 17 **M1**
17/85 x 100 (oe) **M1**
20% **A1**
Answer: 20%

Question 19

recognise original = 372 / 1.20 or show 372 / 1.2 **M1**
£310 cao **A1**
Answer: £310

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Question 20

apply 25% reduction: 120 x 0.75 = 90 or equivalent method	**M1**
apply further 10% reduction: 90 x 0.9 = 81 (method)	**M1**
81.00 cao	**A1**

Answer: 81.00

Question 21

calculate amounts for charity and equipment: 840 x 0.12 = 100.8 and 840 x 0.35 = 294	**M1**
subtract from total to get remainder: 840 - 100.8 - 294 = 445.2	**M1**
divide remainder by 2: 445.2 / 2 = 222.6	**M1**
222.60 cao	**A1**

Answer: 222.60

Question 22

(a) recognises 68 represents 80% (0.8) of the normal price	**M1**
(a) 68 / 0.8 (oe)	**M1**
(a) 85 (pounds)	**A1**

(a) Answer: £85

Question 23

(a) 3000 x 1.05^2 (oe, or year 1 value = 3150)	**M1**
(a) 3150 x 1.05 (oe evaluation)	**M1**
(a) 3307.50 (pounds)	**A1**

(a) Answer: £3307.50

Question 24

2500 x 1.03^4 (oe, or repeated year-on-year multiplication by 1.03)	**M1**
correct evaluation of 1.03^4 = 1.12550881 (oe intermediate values seen)	**M1**
2813.77 (pounds), awrt	**A1**

Answer: £2813.77

Question 25

18000 x 0.88^3 (oe, or repeated year-on-year multiplication by 0.88)	**M1**
correct evaluation of 0.88^3 = 0.681472 (oe intermediate values seen)	**M1**
12266 (pounds), awrt	**A1**

Answer: £12266

Question 26

recognises 39.10 represents 85% (0.85) of the original price	**M1**
39.10 / 0.85 (oe)	**M1**
46 (pounds)	**A1**

Answer: £46

Question 27

use 25 000 x 1.08 x 1.08 or 25 000 x 1.08^2	**M1**
calculate 25 000 x 1.1664 = 29 160 oe	**M1**
29 160 cao (to nearest whole person)	**A1**

Answer: 29 160

Question 28

use amount = 2000 x 1.06^3	**M1**
calculate 2000 x 1.191016 = 2382.032 (or equivalent)	**M1**
interest = amount - principal = 2382.032 - 2000 = 382.032	**M1**
round to nearest pound = 382	**M1**
£382 cao	**A1**

Answer: 382

Question 29

(a) 270 / 1.2 (oe)	**M1**
(a) 225 (pounds)	**A1**

(a) Answer: £225

(b) 0.9 x 225 (ft their part (a) answer)	**M1**
(b) 202.50 (pounds)	**A1**

(b) Answer: £202.50

Question 30

(a) 1.25^6 evaluated (oe, or repeated multiplication by 1.25 six times)	**M1**
(a) 800 x 1.25^6 (oe)	**M1**
(a) 3050, awrt 3sf	**A1**

(a) Answer: 3050 (3sf)

(b) (3051.7578... - 800) / 800 x 100 (oe, ft their unrounded part (a) value)	**M1**
(b) 281%, awrt 3sf	**A1**

(b) Answer: 281% (3sf)

Question 31

sets up (1 + x/100)(1 - x/100) = 0.96 (oe)	**M1**
expands to 1 - $(x/100)^2$ = 0.96 (oe)	**M1**
$(x/100)^2$ = 0.04, so x/100 = 0.2 (oe, positive root taken)	**M1**
x = 20, cao	**A1**

Answer: x = 20

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