5.3 Reverse Percentages: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A toy is priced at £48 after a 20% increase. Work out the original price of the toy.

(Total for Question 1 is 1 mark)

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2 A shop reduces the price of a coat by 30% in a sale. The sale price of the coat is £84.
Which calculation gives the original price of the coat?

- ☐ A) 84 x 0.30
- ☐ B) 84 / 0.70
- ☐ C) 84 x 1.30
- ☐ D) 84 x 0.70

(Total for Question 2 is 1 mark)

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3 A jacket is reduced by 30% in a sale. The sale price of the jacket is £56.
A student's working to find the original price is shown below.

56 x 1.3 = 72.80

The student concludes that the original price of the jacket was £72.80.

(a) Identify the error in the student's method. **(1)**

(b) Work out the correct original price of the jacket. **(2)**

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(Total for Question 3 is 3 marks)

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4 State the decimal multiplier equivalent to an increase of 8%.

(Total for Question 4 is 1 mark)

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5 A shop increases the price of an item by 15%, then later reduces the new price by 10%. The final price is £103.50. Work out the original price before any change.

(Total for Question 5 is 3 marks)

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6 In a sale, all prices are reduced by 10%. A television costs £294.30 in the sale. Work out how much was taken off the original price.

(Total for Question 6 is 3 marks)

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7 Tom says, 'A laptop's price was reduced by 15% in a sale. To find the original price from the sale price, you should increase the sale price by 15%.'
Tom is wrong.
Explain why Tom is wrong. You should include an example with numbers to support your answer.

(Total for Question 7 is 2 marks)

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8 A quantity is decreased by 8% to give 138. Find the original quantity.

(Total for Question 8 is 2 marks)

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9 A textbook has a price increased by 12% and the new price is £22.40. Find the original price of the textbook, giving your answer to 2 decimal places.

(Total for Question 9 is 3 marks)

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10 A motorbike's value decreased by 15% during its first year of ownership. After the decrease, the motorbike is worth £10,200. Rhys says, 'The motorbike must have been worth more than £12,000 when it was new.' Determine, showing your working, whether Rhys is correct.

(Total for Question 10 is 4 marks)

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11 A phone was sold for £306 after a 15% discount was applied. Lorraine says the original price was £360. Is she correct? Show your working.

(Total for Question 11 is 4 marks)

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12 A number n is increased by 15%. The result is then decreased by 20%. The final value is 3 less than n.

(a) Show that this information can be written as $0.92n = n - 3$ **(2)**

(b) Work out the value of n. **(2)**

(Total for Question 12 is 4 marks)

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13 Nia is asked to find the original price of a jumper that was reduced by 15% in a sale to £68. She writes: 'Original price = 68 / 1.15 = 59.13 (2 d.p.)' Explain the error in Nia's method, and work out the correct original price of the jumper.

(Total for Question 13 is 6 marks)

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14 A furniture shop has a sale. The price of a sofa is reduced by 20%. The price of an armchair is reduced by 30%. Before the sale, the armchair's original price was 3/4 of the sofa's original price. After the reductions, the sofa costs £55 more than the armchair. Work out the original price of the sofa.

(Total for Question 14 is 7 marks)

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Mark scheme · 5.3 Reverse Percentages: Test Pack

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

Question 1

40 cao **B1**

Answer: 40.00 or £40 (40.00 or 40) (cao = 40)

Question 2

B **B1**

Answer: B (original price £120)

Question 3

(a) states that the sale price is 70% of the original price (not 130%), so the student should divide £56 by 0.70 rather than multiply by 1.30 oe **B1**

(a) Answer: The student should divide by 0.70, not multiply by 1.30, since £56 represents 70% of the original price.

(b) 56 / 0.70 oe **M1**

(b) £80 cao **A1**

(b) Answer: £80

Question 4

1.08 oe **B1**

Answer: 1.08

Question 5

use combined multiplier 1.15 * 0.90 = 1.035 or state equation x*1.035 = 103.5 **M1**

divide 103.5 by 1.035 or rearrange to x = 103.5/1.035 **M1**

100 cao **A1**

Answer: £100 cao

Question 6

0.9 identified as multiplier **M1**

£327.00 cao (original price) **A1**

£32.70 cao **A1**

Answer: £32.70

Question 7

states the sale price should be divided by 0.85 (not increased by 15%), since the sale price is 85% of the original oe **B1**

correct supporting numerical example showing the two methods give different results, e.g. sale price £85: 85 / 0.85 = 100 (correct) but 85 x 1.15 = 97.75 (incorrect) **B1**

Answer: Tom is wrong; you must divide by 0.85, not increase by 15%. For example, a sale price of £85 gives an original price of £100, not £97.75.

Question 8

correct multiplier 0.92 oe, or 138 / 0.92 seen **M1**

150 cao **A1**

Answer: 150

Question 9

use 22.40 = 112% of original so original = 22.40/1.12 **M1**

perform the division 22.40/1.12 **M1**

20.00 cao, to 2 dp **A1**

Answer: £20.00

Question 10

correct multiplier 0.85 oe **M1**

complete method 10200 / 0.85 **M1**

£12,000 cao **A1**

ft correct conclusion, e.g. Rhys is not correct because the motorbike was worth exactly £12,000, not more than £12,000 **B1**

Answer: £12,000; Rhys is not correct (the motorbike was worth exactly £12,000).

Question 11

calculate original as 306/0.85 or apply reverse percent **M1**

360 cao **A1**

state whether Lorraine is correct with calculation or counterexample **M1**

conclusion: Lorraine is correct (or equivalent statement) cao **A1**

Answer: £360. Lorraine is correct.

Question 12

(a) forms 1.15n x 0.80 or 0.80 x 1.15n **M1**

(a) cso 0.92n = n - 3, with no incorrect working seen **A1**

(a) Answer: 0.92n = n - 3 (shown)

(b) rearranges to 3 = n - 0.92n (= 0.08n) oe **M1**

(b) n = 37.5 cao **A1**

(b) Answer: n = 37.5

Question 13

identifies the error, e.g. Nia has divided by 1.15 (the multiplier for a 15% increase), but the price was decreased by 15%, so she should divide by 0.85, not 1.15 **B1**

correct multiplier for a 15% decrease, 0.85 oe **M1**

complete method 68 / 0.85 **M1**

£80 cao **A1**

valid check, e.g. 80 x 0.85 = 68 **B1**

correct concluding statement that the original price is £80, not the £59.13 Nia found **B1**

Answer: £80 (Nia's £59.13 is incorrect).

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Question 14

expresses the armchair's original price in terms of the sofa's, e.g. armchair original = (3/4)S oe, where S is the sofa's original price	**M1**
correct multiplier for the sofa, 0.8 oe	**M1**
correct expression for the armchair's sale price, 0.7 x (3/4)S oe = 0.525S oe	**M1**
forms a correct equation, e.g. 0.8S - 0.525S = 55 oe	**M1**
simplifies to 0.275S = 55 oe	**M1**
S = 200, i.e. £200 cao	**A1**
ft valid check, e.g. sofa original £200 gives sale price £160; armchair original £150 gives sale price £105; difference 160 - 105 = £55, matches	**B1**

Answer: £200

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