



EP.M112 Working Backwards with Inverse Operations

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 55 minutes

Total Marks

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Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** I think of a number. I multiply it by 3 and then add 5. The result is 29. What was my number?

- ☐ A) 8
- ☐ B) 24
- ☐ C) 72
- ☐ D) 9
- ☐ E) 12

(Total for Question 1 is 1 mark)

- 2** A machine takes a number, subtracts 4, then multiplies the result by 6. The machine shows 60. What number did the machine start with?

- ☐ A) 14
- ☐ B) 56
- ☐ C) 9
- ☐ D) 10
- ☐ E) 64

(Total for Question 2 is 1 mark)

- 3** Start with a number, add 9, then divide by 3. The result is 7. What was the starting number?

- ☐ A) 12
- ☐ B) 6
- ☐ C) 18
- ☐ D) 3
- ☐ E) 63

(Total for Question 3 is 1 mark)

- 4 A number is multiplied by 5 and then 15 is taken away. The final result is 10. Which number was it?

- ☐ A) 5
☐ B) -5
☐ C) 50
☐ D) 25
☐ E) 2

(Total for Question 4 is 1 mark)

- 5 I first multiply a number by 2, then I multiply the result by 3, then I add 4. The final result is 34. What was the original number?

- ☐ A) 5
☐ B) 6
☐ C) 34
☐ D) 30
☐ E) 10

(Total for Question 5 is 1 mark)

- 6 A number is squared and then 9 is subtracted to give 16. Which positive whole number could you have started with?

- ☐ A) 5
☐ B) -5
☐ C) 2
☐ D) 7
☐ E) 4

(Total for Question 6 is 1 mark)

- 7 Add 12 to a number, then divide the result by 4. The final answer is 9. What was the original number?

- ☐ A) 24
☐ B) 21
☐ C) 12
☐ D) 36
☐ E) 18

(Total for Question 7 is 1 mark)

8 Multiply a number by 10 and then add 3. The final result is 123. What was the number?

- ☐ A) 12
- ☐ B) 120
- ☐ C) 13
- ☐ D) 15
- ☐ E) 9

(Total for Question 8 is 1 mark)

9 You double a number, add 1, then double the result and get 50. What was the original number?

- ☐ A) 12
- ☐ B) 11
- ☐ C) 13
- ☐ D) 6
- ☐ E) 25

(Total for Question 9 is 1 mark)

10 A number is reduced by 30% and then 4 is subtracted to give 31. What was the number at the start?

- ☐ A) 50
- ☐ B) 35
- ☐ C) 45
- ☐ D) 62
- ☐ E) 31

(Total for Question 10 is 1 mark)

11 Start with a number. Add 5, multiply the result by 4, then subtract 6. The final answer is 38. What was the starting number?

- ☐ A) 6
- ☐ B) 7
- ☐ C) 8
- ☐ D) 9
- ☐ E) 5

(Total for Question 11 is 1 mark)

12 A number is divided by 2, then divided by 3, and then 10 is added. The result is 20. What was the original number?

- ☐ A) 60
- ☐ B) 30
- ☐ C) 40
- ☐ D) 90
- ☐ E) 120

(Total for Question 12 is 1 mark)

13 A pupil thinks of a number. He adds 8, halves the result, then multiplies by 5 and gets 55. Work out the original number.

(Total for Question 13 is 2 marks)

14 A number is increased by 15% and then the new amount is divided by 3 to give 46. Find the original number.

(Total for Question 14 is 3 marks)

15 Start with a number. Multiply it by 3, add 7 and then divide the result by 2. The final answer is 20. What was the starting number?

(Total for Question 15 is 3 marks)

16 A number is decreased by 25% and then 10 is added to the result. The final amount is 85. What was the original number?

(Total for Question 16 is 2 marks)

- 17** A number is multiplied by $\frac{2}{3}$ and then 5 is added. The final result is 29. Find the original number.

(Total for Question 17 is 3 marks)

- 18** I think of a number. I add 4, multiply the result by 3, subtract 9 and then divide by 2. The final answer is 15. Work out the original number.

(Total for Question 18 is 3 marks)

- 19** A number is squared, then 6 is added and the result is 31. What number was it (positive whole number)?

(Total for Question 19 is 2 marks)

- 20** A driver halves the miles driven, then adds 12 miles and multiplies the result by 4 to get 200 miles. How many miles were driven at the start?

(Total for Question 20 is 3 marks)

Mark scheme · EP.M112 Working Backwards with Inverse Operations

Question 1

- **B1** correct option A (8) cao
- **Answer: A) 8** (because $(29 - 5) / 3 = 8$).

Question 2

- **B1** correct option A (14) cao
- **Answer: A) 14** (because $60 / 6 = 10$, then $10 + 4 = 14$).

Question 3

- **B1** correct option A (12) cao
- **Answer: A) 12** (because $7 \times 3 = 21$, then $21 - 9 = 12$).

Question 4

- **B1** correct option A (5) cao
- **Answer: A) 5** (because $10 + 15 = 25$, then $25 / 5 = 5$).

Question 5

- **B1** correct option A (5) cao
- **Answer: A) 5** ($((34 - 4) / 6 = 30 / 6 = 5)$).

Question 6

- **B1** correct option A (5) cao
- **Answer: A) 5** (because $16 + 9 = 25$ and $\sqrt{25} = 5$. The question asked for a whole number, so we take 5).

Question 7

- **B1** correct option A (24) cao
- **Answer: A) 24** ($9 \times 4 = 36$; $36 - 12 = 24$).

Question 8

- **B1** correct option A (12) cao
- **Answer: A) 12** ($((123 - 3) / 10 = 120 / 10 = 12)$).

Question 9

- **B1** correct option A (12) cao
- **Answer: A) 12** (Let original be x : $2(2x + 1) = 50 \rightarrow 4x + 2 = 50 \rightarrow x = 12$).

Question 10

- **B1** correct option A (50) cao
- **Answer: A) 50** ($31 + 4 = 35$; $35 / 0.7 = 50$).

Question 11

- **B1** correct option A (6) cao
- **Answer: A) 6** ($38 + 6 = 44$; $44 / 4 = 11$; $11 - 5 = 6$).

Question 12

- **B1** correct option A (60) cao
- **Answer: A) 60** ($20 - 10 = 10$; $10 \times 3 = 30$; $30 \times 2 = 60$).

Question 13

- **M1** Reverse the last operation: $55 / 5 = 11$ (method shown) ft
- **A1** Original number 14 cao
- **Answer: 14** (working: $55 / 5 = 11$; $11 \times 2 = 22$; $22 - 8 = 14$).

Question 14

- **M1** Multiply 46 by 3 to undo the division: $46 \times 3 = 138$ ft
- **M1** Divide by 1.15 to remove the 15% increase: $138 / 1.15 (= 120)$ seen
- **A1** Original number 120 cao
- **Answer: 120 ($46 \times 3 = 138$; $138 / 1.15 = 120$).**

Question 15

- **M1** Undo division: $20 \times 2 = 40$ (method shown) ft
- **M1** Undo addition: $40 - 7 = 33$ (method shown) ft
- **A1** Original number 11 cao
- **Answer: 11 ($20 \times 2 = 40$; $40 - 7 = 33$; $33 / 3 = 11$).**

Question 16

- **M1** Subtract 10 to undo the addition: $85 - 10 = 75$ seen
- **A1** Original number 100 cao ($75 / 0.75 = 100$)
- **Answer: 100 ($85 - 10 = 75$; $75 / 0.75 = 100$).**

Question 17

- **M1** Subtract 5 to undo the addition: $29 - 5 = 24$ seen
- **M1** Divide by $2/3$ (multiply by $3/2$): $24 \times 3/2 = 36$ seen
- **A1** Original number 36 cao
- **Answer: 36 ($29 - 5 = 24$; $24 \div (2/3) = 24 \times 3/2 = 36$).**

Question 18

- **M1** Undo final division: $15 \times 2 = 30$ seen
- **M1** Undo subtraction: $30 + 9 = 39$ seen
- **A1** Original number 9 cao ($39 / 3 = 13$; $13 - 4 = 9$) ft
- **Answer: 9 ($15 \times 2 = 30$; $30 + 9 = 39$; $39 / 3 = 13$; $13 - 4 = 9$).**

Question 19

- **M1** Subtract 6: $31 - 6 = 25$ seen
- **A1** Original number 5 cao ($\sqrt{25} = 5$)
- **Answer: 5 ($31 - 6 = 25$; $\sqrt{25} = 5$).**

Question 20

- **M1** Undo multiplication: $200 / 4 = 50$ seen
- **M1** Undo addition: $50 - 12 = 38$ seen
- **A1** Original miles 76 cao ($38 \times 2 = 76$)
- **Answer: 76 ($200 / 4 = 50$; $50 - 12 = 38$; $38 \times 2 = 76$).**