2.88 Working Backwards with Inverse Operations: Test Pack

Total Marks

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

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

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

(2)

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2 A machine does this to a number: add 13, then multiply by 9. The output is 333. What was the input?

- ☐ A) 37
- ☐ B) 25
- ☐ C) 320
- ☐ D) 24
- ☐ E) 3,114

---

3 A machine does this to a number: subtract 9, then add 6. The output is 11. What was the input?

- ☐ A) 13
- ☐ B) 8
- ☐ C) 14
- ☐ D) 20
- ☐ E) 23

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4 I think of a number and then add 2, then subtract 15. The result is 21. What was my number?

- [ ] A) 36
- [ ] B) 8
- [ ] C) 33
- [ ] D) 34
- [ ] E) 19

---

5 I think of a number and then multiply by 3, then subtract 10. The result is 32. What was my number?

- [ ] A) 86
- [ ] B) 13
- [ ] C) 14
- [ ] D) 17
- [ ] E) 15

---

6 I think of a number and then multiply by 4, then add 3. The result is 135. What was my number?

- [ ] A) 34
- [ ] B) 33
- [ ] C) 32
- [ ] D) 543
- [ ] E) 37

---

7 A machine does this to a number: add 8, then subtract 3. The output is 26. What was the input?

- [ ] A) 18
- [ ] B) 31
- [ ] C) 29
- [ ] D) 20
- [ ] E) 21

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8 A machine does this to a number: subtract 6, then add 9. The output is 30. What was the input?

- [ ] A) 26
- [ ] B) 36
- [ ] C) 27
- [ ] D) 33
- [ ] E) 28

---

9 A machine does this to a number: subtract 12, then add 8. The output is 13. What was the input?

- [ ] A) 18
- [ ] B) 9
- [ ] C) 25
- [ ] D) 29
- [ ] E) 17

---

10 I think of a number and then add 7, then multiply by 4. The result is 64. What was my number?

- [ ] A) 10
- [ ] B) 9
- [ ] C) 284
- [ ] D) 16
- [ ] E) 57

---

11 I think of a number and then multiply by 3, then add 11. The result is 20. What was my number?

- [ ] A) 71
- [ ] B) 2
- [ ] C) 3
- [ ] D) 6
- [ ] E) 4

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12 A machine does this to a number: subtract 9, then multiply by 2. The output is 38. What was the input?

- [ ] A) 28
- [ ] B) 29
- [ ] C) 58
- [ ] D) 47
- [ ] E) 27

---

13 A machine does this to a number: add 12, then subtract 11. The output is 17. What was the input?

- [ ] A) 17
- [ ] B) 16
- [ ] C) 5
- [ ] D) 18
- [ ] E) 28

---

14 A machine does this to a number: multiply by 8, then add 2. The output is 250. What was the input?

- [ ] A) 2,002
- [ ] B) 30
- [ ] C) 32
- [ ] D) 31
- [ ] E) 39

---

15 I think of a number and then add 15, then subtract 12. The result is 19. What was my number?

- [ ] A) 16
- [ ] B) 4
- [ ] C) 22
- [ ] D) 15
- [ ] E) 17

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16 I think of a number and then add 11, then multiply by 5. The result is 65. What was my number?

- [ ] A) 54
- [ ] B) 380
- [ ] C) 3
- [ ] D) 1
- [ ] E) 2

---

17 I think of a number and then add 3, then divide by 4. The result is 8. What was my number?

- [ ] A) 20
- [ ] B) 28
- [ ] C) 29
- [ ] D) 5
- [ ] E) 32

---

18 A machine does this to a number: add 14, then subtract 5. The output is 26. What was the input?

- [ ] A) 35
- [ ] B) 12
- [ ] C) 17
- [ ] D) 18
- [ ] E) 31

---

19 A machine does this to a number: multiply by 5, then add 12. The output is 107. What was the input?

- [ ] A) 24
- [ ] B) 547
- [ ] C) 18
- [ ] D) 19
- [ ] E) 20

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20 A machine does this to a number: multiply by 7, then subtract 13. The output is 22. What was the input?

- [ ] A) 5
- [ ] B) 6
- [ ] C) 141
- [ ] D) 12
- [ ] E) 4

---

21 I think of a number and then multiply by 5, then add 13. The result is 78. What was my number?

- [ ] A) 403
- [ ] B) 18
- [ ] C) 14
- [ ] D) 12
- [ ] E) 13

---

22 Tariq spends a quarter of their money, then spends £15. Tariq has £174 left. How much did Tariq have at the start?

- [ ] A) £363.00
- [ ] B) £189.00
- [ ] C) £252.00
- [ ] D) £348.00
- [ ] E) £240.00

---

23 Tom spends a sixth of their money, then spends £10, then spends a sixth of what is left. Tom has £325 left. How much did Tom have at the start?

- [ ] A) £468
- [ ] B) £660
- [ ] C) £480
- [ ] D) £479
- [ ] E) £335

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24 I think of a number and then multiply by 8, then subtract 2. The result is 230. What was my number?

- [ ] A) 29
- [ ] B) 30
- [ ] C) 28
- [ ] D) 37
- [ ] E) 1,838

---

25 A machine does this to a number: subtract 13, then divide by 3. The output is 5. What was the input?

- [ ] A) 54
- [ ] B) 18
- [ ] C) 29
- [ ] D) 41
- [ ] E) 28

---

26 Ravi spends half of their money, then spends £14. Ravi has £202 left. How much did Ravi have at the start?

- [ ] A) £432.00
- [ ] B) £216.00
- [ ] C) £418.00
- [ ] D) £444.00
- [ ] E) £431.00

---

27 Priya spends £3, then spends £11, then spends half of what is left. Priya has £107 left. How much did Priya have at the start?

- [ ] A) £121.00
- [ ] B) £216.00
- [ ] C) £229.00
- [ ] D) £174.50
- [ ] E) £228.00

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28 A machine does this to a number: subtract 11, then add 14, then multiply by 4. The output is 76. What was the input?

- [ ] A) 17
- [ ] B) 316
- [ ] C) 15
- [ ] D) 73
- [ ] E) 16

---

29 A machine does this to a number: multiply by 4, then subtract 15. The output is 45. What was the input?

- [ ] A) 16
- [ ] B) 165
- [ ] C) 19
- [ ] D) 14
- [ ] E) 15

---

30 Aisha spends a quarter of their money, then spends £2. Aisha has £106 left. How much did Aisha have at the start?

- [ ] A) £134.50
- [ ] B) £143.00
- [ ] C) £214.00
- [ ] D) £144.00
- [ ] E) £108.00

---

31 Tariq spends a third of their money, then spends £5. Tariq has £251 left. How much did Tariq have at the start?

- [ ] A) £256.00
- [ ] B) £384.00
- [ ] C) £383.00
- [ ] D) £507.00
- [ ] E) £385.00

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32 I think of a number and then divide by 4, then multiply by 5. The result is 10. What was my number?

- [ ] A) 7
- [ ] B) 12
- [ ] C) 9
- [ ] D) 8
- [ ] E) 40

---

33 A machine does this to a number: add 15, then multiply by 4, then subtract 4. The output is 132. What was the input?

- [ ] A) 584
- [ ] B) 20
- [ ] C) 19
- [ ] D) 18
- [ ] E) 34

---

34 A machine does this to a number: subtract 2, then divide by 4. The output is 1. What was the input?

- [ ] A) 6
- [ ] B) 8
- [ ] C) 3
- [ ] D) 12
- [ ] E) 7

---

35 A machine does this to a number: multiply by 9, then subtract 12. The output is 195. What was the input?

- [ ] A) 22
- [ ] B) 32
- [ ] C) 24
- [ ] D) 1,743
- [ ] E) 23

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36 A machine does this to a number: add 8, then multiply by 5, then subtract 9. The output is 61. What was the input?

- [ ] A) 6
- [ ] B) 14
- [ ] C) 5
- [ ] D) 336
- [ ] E) 7

---

37 I think of a number and then multiply by 2, then subtract 5. The result is 11. What was my number?

- [ ] A) 7
- [ ] B) 9
- [ ] C) 17
- [ ] D) 10
- [ ] E) 8

---

38 A machine does this to a number: multiply by 5, then add 4. The output is 29. What was the input?

- [ ] A) 149
- [ ] B) 5
- [ ] C) 6
- [ ] D) 4
- [ ] E) 10

---

39 Tom spends a third of their money, then spends £3, then spends £5. Tom has £280 left. How much did Tom have at the start?

- [ ] A) £568.00
- [ ] B) £560.00
- [ ] C) £432.00
- [ ] D) £288.00
- [ ] E) £433.00

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40 Esme spends two thirds of their money, then spends a sixth of what is left, then spends £3. Esme has £107 left. How much did Esme have at the start?

- [ ] A) £110.00
- [ ] B) £217.00
- [ ] C) £395.00
- [ ] D) £396.00
- [ ] E) £397.00

---

41 I think of a number and then multiply by 8, then add 12, then subtract 7. The result is 125. What was my number?

- [ ] A) 14
- [ ] B) 15
- [ ] C) 16
- [ ] D) 1,005
- [ ] E) 23

---

42 A machine does this to a number: subtract 15, then divide by 2, then add 5. The output is 13. What was the input?

- [ ] A) 41
- [ ] B) 46
- [ ] C) 4
- [ ] D) 51
- [ ] E) 31

---

43 Kwame spends £6, then spends half of what is left, then spends £5. Kwame has £178 left. How much did Kwame have at the start?

- [ ] A) £373.00
- [ ] B) £372.00
- [ ] C) £367.00
- [ ] D) £356.00
- [ ] E) £189.00

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44 Anya spends half of their money, then spends £10, then spends £3. Anya has £11 left. How much did Anya have at the start?

- [ ] A) £24.00
- [ ] B) £48.00
- [ ] C) £35.00
- [ ] D) £29.50
- [ ] E) £49.00

---

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

- [ ] A) 4
- [ ] B) 5
- [ ] C) -5
- [ ] D) 2
- [ ] E) 7

---

46 I think of a number and then add 12, then subtract 5. The result is 36. What was my number?

- [ ] A) 41
- [ ] B) 28
- [ ] C) 43
- [ ] D) 24
- [ ] E) 29

---

47 A machine does this to a number: add 10, then subtract 12. The output is 16. What was the input?

- [ ] A) 14
- [ ] B) 18
- [ ] C) 6
- [ ] D) 17
- [ ] E) 19

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48 Sana spends a sixth of their money, then spends £3. Sana has £327 left. How much did Sana have at the start?

- [ ] A) £384.00
- [ ] B) £657.00
- [ ] C) £395.00
- [ ] D) £330.00
- [ ] E) £396.00

---

49 Grace spends two thirds of their money, then spends £2, then spends a sixth of what is left. Grace has £85 left. How much did Grace have at the start?

- [ ] A) £313.00
- [ ] B) £312.00
- [ ] C) £87.00
- [ ] D) £172.00
- [ ] E) £300.00

---

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

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

---

51 I think of a number and then subtract 4, then add 15, then multiply by 8. The result is 392. What was my number?

- [ ] A) 381
- [ ] B) 38
- [ ] C) 3,224
- [ ] D) 37
- [ ] E) 39

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52 A machine does this to a number: add 4, then subtract 11. The output is 6. What was the input?

- ☐ A) 12
- ☐ B) 2
- ☐ C) 13
- ☐ D) 14
- ☐ E) -1

---

53 A machine does this to a number: subtract 4, then add 11. The output is 30. What was the input?

- ☐ A) 37
- ☐ B) 22
- ☐ C) 24
- ☐ D) 23
- ☐ E) 34

---

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

(2)

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55 A number is multiplied by 2/3 and then 5 is added. The final result is 29. Find the original number.

(3)

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Mark scheme · 2.88 Working Backwards with Inverse Operations: Test Pack

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

Question 1

Subtract 6: 31 - 6 = 25 seen **M1**

Original number 5 cao ($\sqrt{25}$ = 5) **A1**

Answer: 5 (31 - 6 = 25; $\sqrt{25}$ = 5).

Question 2

correct option D (24) cao **B1**

Answer: D) 24

Question 3

correct option C (14) cao **B1**

Answer: C) 14

Question 4

correct option D (34) cao **B1**

Answer: D) 34

Question 5

correct option C (14) cao **B1**

Answer: C) 14

Question 6

correct option B (33) cao **B1**

Answer: B) 33

Question 7

correct option E (21) cao **B1**

Answer: E) 21

Question 8

correct option C (27) cao **B1**

Answer: C) 27

Question 9

correct option E (17) cao **B1**

Answer: E) 17

Question 10

correct option B (9) cao **B1**

Answer: B) 9

Question 11

correct option C (3) cao **B1**

Answer: C) 3

Question 12

correct option A (28) cao **B1**

Answer: A) 28

Question 13

correct option B (16) cao **B1**

Answer: B) 16

Question 14

correct option D (31) cao **B1**

Answer: D) 31

Question 15

correct option A (16) cao **B1**

Answer: A) 16

Question 16

correct option E (2) cao **B1**

Answer: E) 2

Question 17

correct option C (29) cao **B1**

Answer: C) 29

Question 18

correct option C (17) cao **B1**

Answer: C) 17

Question 19

correct option D (19) cao **B1**

Answer: D) 19

Question 20

correct option A (5) cao **B1**

Answer: A) 5

Question 21

correct option E (13) cao **B1**

Answer: E) 13

Question 22

correct option C (£252.00) cao **B1**

Answer: C) £252.00

Question 23

correct option C (£480) cao **B1**

Answer: C) £480

Question 24

correct option A (29) cao **B1**

Answer: A) 29

Question 25

correct option E (28) cao **B1**

Answer: E) 28

Question 26

correct option A (£432.00) cao **B1**

Answer: A) £432.00

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Question 27

correct option E (£228.00) cao **B1**

Answer: E) £228.00

Question 28

correct option E (16) cao **B1**

Answer: E) 16

Question 29

correct option E (15) cao **B1**

Answer: E) 15

Question 30

correct option D (£144.00) cao **B1**

Answer: D) £144.00

Question 31

correct option B (£384.00) cao **B1**

Answer: B) £384.00

Question 32

correct option D (8) cao **B1**

Answer: D) 8

Question 33

correct option C (19) cao **B1**

Answer: C) 19

Question 34

correct option A (6) cao **B1**

Answer: A) 6

Question 35

correct option E (23) cao **B1**

Answer: E) 23

Question 36

correct option A (6) cao **B1**

Answer: A) 6

Question 37

correct option E (8) cao **B1**

Answer: E) 8

Question 38

correct option B (5) cao **B1**

Answer: B) 5

Question 39

correct option C (£432.00) cao **B1**

Answer: C) £432.00

Question 40

correct option D (£396.00) cao **B1**

Answer: D) £396.00

Question 41

correct option B (15) cao **B1**

Answer: B) 15

Question 42

correct option E (31) cao **B1**

Answer: E) 31

Question 43

correct option B (£372.00) cao **B1**

Answer: B) £372.00

Question 44

correct option B (£48.00) cao **B1**

Answer: B) £48.00

Question 45

correct option B (5) cao **B1**

Answer: B) 5 (because 16 + 9 = 25 and $\sqrt{25}$ = 5. The question asked for a whole number, so we take 5).

Question 46

correct option E (29) cao **B1**

Answer: E) 29

Question 47

correct option B (18) cao **B1**

Answer: B) 18

Question 48

correct option E (£396.00) cao **B1**

Answer: E) £396.00

Question 49

correct option B (£312.00) cao **B1**

Answer: B) £312.00

Question 50

correct option C (12) cao **B1**

Answer: C) 12 ((123 - 3) / 10 = 120 / 10 = 12).

Question 51

correct option B (38) cao **B1**

Answer: B) 38

Question 52

correct option C (13) cao **B1**

Answer: C) 13

Question 53

correct option D (23) cao **B1**

Answer: D) 23

Question 54

Reverse the last operation: 55 / 5 = 11 (method shown) ft **M1**

Original number 14 cao **A1**

Answer: 14 (working: 55 / 5 = 11; 11 x 2 = 22; 22 - 8 = 14).

Question 55

Subtract 5 to undo the addition: 29 - 5 = 24 seen **M1**

Divide by 2/3 (multiply by 3/2): 24 x 3/2 = 36 seen **M1**

Original number 36 cao **A1**

Answer: 36 (29 - 5 = 24; 24 ÷ (2/3) = 24 x 3/2 = 36).

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