2.107 Function Machines and Simple Equations: Test Pack

Total Marks

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A function machine does: multiply by 3. What is the output when the input is 4?

- ☐ A) 7
- ☐ B) 12
- ☐ C) 1
- ☐ D) 16
- ☐ E) 11

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2 A function machine turns 6 into 18, and also turns 10 into 30. Which single operation is the rule of the machine?

- ☐ A) square the input
- ☐ B) add 12
- ☐ C) multiply by 2 then add 6
- ☐ D) add 6 then multiply by 2
- ☐ E) multiply by 3

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3 A function machine takes an input and does this: multiply by 3, then add 10. What is the output when the input is 6?

- ☐ A) 28
- ☐ B) 48
- ☐ C) 18
- ☐ D) -8
- ☐ E) 27

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4 A function machine takes an input and does this: add 2, then subtract 6. What is the output when the input is 22?

- ☐ A) 18
- ☐ B) 24
- ☐ C) 26
- ☐ D) 16
- ☐ E) 17

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5 Solve x - 9 = -2. Give the value of x.

(1)

---

6 A function machine takes an input and does this: subtract 8, then add 15. What is the output when the input is 3?

- ☐ A) -5
- ☐ B) 11
- ☐ C) 10
- ☐ D) 18
- ☐ E) -4

---

7 A function machine takes an input and does this: multiply by 6, then subtract 14. What is the output when the input is 7?

- ☐ A) -42
- ☐ B) 27
- ☐ C) 42
- ☐ D) 29
- ☐ E) 28

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8 A function machine takes an input and does this: multiply by 9, then add 15. What is the output when the input is 29?

- ☐ A) 396
- ☐ B) 276
- ☐ C) 44
- ☐ D) 277
- ☐ E) 261

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9 A machine does: multiply by 3 then add 4. The output is 25. Find the input. Show your method.

(2)

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10 A function machine takes an input and does this: multiply by 7, then add 15. What is the output when the input is 13?

- ☐ A) 196
- ☐ B) 105
- ☐ C) 106
- ☐ D) 28
- ☐ E) 91

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11 A function gives f(2) = 11 and f(5) = 26. Assuming f(x) = ax + b, find a and b and give the rule of the machine.

(2)

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12 If f(x) = 2x - 3, find f(10).

- ☐ A) 20
- ☐ B) 30
- ☐ C) 23
- ☐ D) 7
- ☐ E) 17

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13 Solve 3(x - 2) = 12. Show your method.

(2)

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14 Solve 2x + 3 = 7x - 12. Show all steps.

(3)

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15 A function machine takes an input and does this: add 6, then multiply by 8, then divide by 2. What is the output when the input is 16?

- ☐ A) 176
- ☐ B) 70
- ☐ C) 64
- ☐ D) 89
- ☐ E) 88

---

16 A function machine takes an input and does this: add 11, then multiply by 2, then subtract 3. What is the output when the input is 14?

- ☐ A) 50
- ☐ B) 47
- ☐ C) 33
- ☐ D) 48
- ☐ E) 46

---

17 A function machine takes an input and does this: subtract 11, then multiply by 6. What is the output when the input is 27?

- ☐ A) 151
- ☐ B) 96
- ☐ C) 162
- ☐ D) 97
- ☐ E) 16

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18 A function machine takes an input and does this: subtract 3, then add 7. What is the output when the input is 22?

- [ ] A) 26
- [ ] B) 25
- [ ] C) 27
- [ ] D) 18
- [ ] E) 19

---

19 A function machine takes an input and does this: subtract 11, then add 9, then divide by 5. What is the output when the input is 12?

- [ ] A) 10
- [ ] B) 1
- [ ] C) 3
- [ ] D) 2
- [ ] E) 70

---

20 A function machine takes an input and does this: add 8, then multiply by 3. What is the output when the input is 21?

- [ ] A) 87
- [ ] B) 71
- [ ] C) 63
- [ ] D) 29
- [ ] E) 86

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21 A function machine takes an input and does this: multiply by 6, then divide by 3, then subtract 3. What is the output when the input is 14?

- [ ] A) 25
- [ ] B) 22
- [ ] C) 24
- [ ] D) 10
- [ ] E) 26

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22 A function machine takes an input and does this: multiply by 6, then divide by 3. What is the output when the input is 30?

- [ ] A) 61
- [ ] B) 180
- [ ] C) 15
- [ ] D) 60
- [ ] E) 59

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23 A function machine takes an input and does this: add 9, then subtract 12, then divide by 3. What is the output when the input is 12?

- [ ] A) 3
- [ ] B) 9
- [ ] C) 45
- [ ] D) 1
- [ ] E) 2

---

24 A function machine takes an input and does this: divide by 5, then add 14. What is the output when the input is 5?

- [ ] A) 16
- [ ] B) 19
- [ ] C) 15
- [ ] D) 11
- [ ] E) 1

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25 A function machine takes an input and does this: add 12, then subtract 3. What is the output when the input is 10?

- [ ] A) 19
- [ ] B) 7
- [ ] C) 22
- [ ] D) 1
- [ ] E) 18

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26 A function machine takes an input and does this: subtract 14, then add 11. What is the output when the input is 11?

- [ ] A) 14
- [ ] B) 7
- [ ] C) 22
- [ ] D) -3
- [ ] E) 8

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Mark scheme · 2.107 Function Machines and Simple Equations: Test Pack

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

Question 1

option B (12) cao **B1**

Answer: B) 12

Question 2

option E (multiply by 3) cao **B1**

Answer: E) multiply by 3

Question 3

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

Answer: A) 28

Question 4

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

Answer: A) 18

Question 5

x = 7 cao **B1**

Answer: x = 7

Question 6

correct option C (10) cao **B1**

Answer: C) 10

Question 7

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

Answer: E) 28

Question 8

correct option B (276) cao **B1**

Answer: B) 276

Question 9

3x + 4 = 25 seen and 3x = 21 or equivalent method **M1**

x = 7 cao **A1**

Answer: x = 7

Question 10

correct option C (106) cao **B1**

Answer: C) 106

Question 11

a = (26 - 11)/(5 - 2) = 15/3 = 5 or equivalent seen **M1**

a = 5, b = 1 so 'multiply by 5 then add 1' cao **A1**

Answer: multiply by 5 then add 1

Question 12

option E (17) cao **B1**

Answer: E) 17

Question 13

3(x - 2) = 12 then x - 2 = 4 or equivalent method **M1**

x = 6 cao **A1**

Answer: x = 6

Question 14

Collecting x terms: 2x - 7x = -12 - 3 or 5x = 15 seen; accept an equivalent route to the same value without algebra, such as trial and improvement, provided the working is shown **M1**

Division or simplification step to find x seen (5x = 15) **M1**

x = 3 cao **A1**

Answer: x = 3

Question 15

correct option E (88) cao **B1**

Answer: E) 88

Question 16

correct option B (47) cao **B1**

Answer: B) 47

Question 17

correct option B (96) cao **B1**

Answer: B) 96

Question 18

correct option A (26) cao **B1**

Answer: A) 26

Question 19

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

Answer: D) 2

Question 20

correct option A (87) cao **B1**

Answer: A) 87

Question 21

correct option A (25) cao **B1**

Answer: A) 25

Question 22

correct option D (60) cao **B1**

Answer: D) 60

Question 23

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

Answer: A) 3

Question 24

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

Answer: C) 15

Question 25

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

Answer: A) 19

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Question 26

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

Answer: E) 8

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