2.108 Substitution and Formulae in Words: Test Pack

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

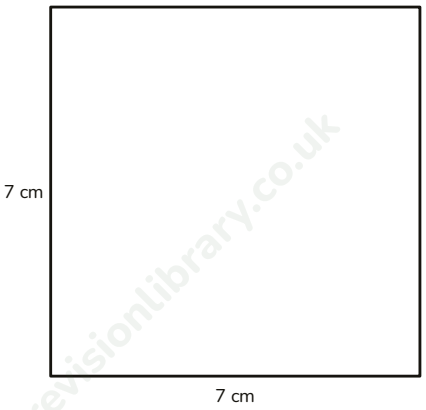
Answer ALL questions. Show all your working.

1 The time in minutes, Y, for a recipe is given by Y = 2(a + 3b) + 4 where a and b are whole numbers. Find Y when a = 2 and b = 3. Then if Y = 48 and a = 4, find b. Show your steps.

(3)

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2 The perimeter P of a square with side s is P = 4s. Find P when s = 7 cm.



- ☐ A) 14 cm
- ☐ B) 49 cm
- ☐ C) 21 cm
- ☐ D) 35 cm
- ☐ E) 28 cm

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3 Work out the value of $6n^2 + 7$ when $n = 4$.

- [ ] A) 583
- [ ] B) 31
- [ ] C) 103
- [ ] D) 89
- [ ] E) 55

---

4 Work out the value of $41 - 2n$ when $n = 6$.

- [ ] A) 45
- [ ] B) 30
- [ ] C) 234
- [ ] D) 33
- [ ] E) 29

---

5 Work out the value of $4n + 6$ when $n = 2$.

- [ ] A) 20
- [ ] B) 32
- [ ] C) 15
- [ ] D) 14
- [ ] E) 48

---

6 The cost of a party entertainer, C pounds, is given by $C = 12 + 9n$, where n is the number of children. What is the cost for 5 children?

- [ ] A) £105.00
- [ ] B) £26.00
- [ ] C) £57.00
- [ ] D) £69.00
- [ ] E) £540.00

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7 The cost of a taxi, C pounds, is given by C = 25 + 4n, where n is the number of miles. What is the cost for 8 miles?

- ☐ A) £232.00
- ☐ B) £58.00
- ☐ C) £56.00
- ☐ D) £57.00
- ☐ E) £204.00

---

8 Work out the value of 3n + 2 when n = 4.

- ☐ A) 20
- ☐ B) 36
- ☐ C) 9
- ☐ D) 13
- ☐ E) 14

---

9 Work out the value of 4(n + 9) when n = 4.

- ☐ A) 413
- ☐ B) 20
- ☐ C) 25
- ☐ D) 17
- ☐ E) 52

---

10 The function t is defined by t = 4a - 5. Calculate t when a = 3, then find a when t = 11. Give both answers.

(2)

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11 The cost of a party entertainer, C pounds, is given by C = 8 + 2n, where n is the number of children. What is the cost for 12 children?

- [ ] A) £98.00
- [ ] B) £22.00
- [ ] C) £24.00
- [ ] D) £120.00
- [ ] E) £32.00

---

12 Work out the value of 5x + 4y when x = 5 and y = 7.

- [ ] A) 53
- [ ] B) 55
- [ ] C) 108
- [ ] D) 102
- [ ] E) 21

---

13 Work out the value of $8n^2 + 8$ when n = 4.

- [ ] A) 136
- [ ] B) 1,032
- [ ] C) 72
- [ ] D) 135
- [ ] E) 120

---

14 The cost of a party entertainer, C pounds, is given by C = 12 + 7n, where n is the number of children. What is the cost for 10 children?

- [ ] A) £840.00
- [ ] B) £29.00
- [ ] C) £127.00
- [ ] D) £190.00
- [ ] E) £82.00

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15 The cost of a party entertainer, C pounds, is given by C = 25 + 9n, where n is the number of children. What is the cost for 12 children?

- ☐ A) £408.00
- ☐ B) £108.00
- ☐ C) £133.00
- ☐ D) £309.00
- ☐ E) £132.00

---

16 The cost of a party entertainer, C pounds, is given by C = 30 + 12n, where n is the number of children. What is the cost for 3 children?

- ☐ A) £66.00
- ☐ B) £102.00
- ☐ C) £67.00
- ☐ D) £1,080.00
- ☐ E) £126.00

---

17 Work out the value of 2(n + 6) when n = 5.

- ☐ A) 22
- ☐ B) 13
- ☐ C) 60
- ☐ D) 16
- ☐ E) 211

---

18 The volume V of a small box is V = l x w x h. Find V when l = 2 cm, w = 3 cm and h = 4 cm. Then find h when V = 36 cm^3 and l = 3 cm, w = 3 cm.

(2)

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19 The cost of a party entertainer, C pounds, is given by C = 8 + 4n, where n is the number of children. What is the cost for 3 children?

- ☐ A) £36
- ☐ B) £19
- ☐ C) £20
- ☐ D) £28
- ☐ E) £15

---

20 Work out the value of $4n^2 + 4$ when n = 2.

- ☐ A) 68
- ☐ B) 64
- ☐ C) 20
- ☐ D) 12
- ☐ E) 19

---

21 Work out the value of 74 - 9n when n = 5.

- ☐ A) 60
- ☐ B) 70
- ☐ C) 28
- ☐ D) 29
- ☐ E) 325

---

22 Work out the value of $7n^2 + 8$ when n = 4.

- ☐ A) 104
- ☐ B) 64
- ☐ C) 792
- ☐ D) 36
- ☐ E) 120

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23 The cost of a hall hire, C pounds, is given by C = 25 + 6n, where n is the number of hours. What is the cost for 14 hours?

- [ ] A) £110.00
- [ ] B) £356.00
- [ ] C) £434.00
- [ ] D) £109.00
- [ ] E) £108.00

---

24 The cost of a hall hire, C pounds, is given by C = 25 + 12n, where n is the number of hours. What is the cost for 6 hours?

- [ ] A) £72.00
- [ ] B) £96.00
- [ ] C) £222.00
- [ ] D) £162.00
- [ ] E) £97.00

---

25 The cost of a taxi, C pounds, is given by C = 25 + 6n, where n is the number of miles. What is the cost for 4 miles?

- [ ] A) £124.00
- [ ] B) £50.00
- [ ] C) £106.00
- [ ] D) £600.00
- [ ] E) £49.00

---

26 Work out the value of 52 - 5n when n = 7.

- [ ] A) 87
- [ ] B) 5
- [ ] C) 329
- [ ] D) 54
- [ ] E) 17

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27 Work out the value of 7(n + 8) when n = 2.

- [ ] A) 17
- [ ] B) 70
- [ ] C) 22
- [ ] D) 69
- [ ] E) 112

---

28 Work out the value of 3n + 6 when n = 4.

- [ ] A) 36
- [ ] B) 18
- [ ] C) 40
- [ ] D) 17
- [ ] E) 6

---

29 The cost of a taxi, C pounds, is given by C = 10 + 6n, where n is the number of miles. What is the cost for 11 miles?

- [ ] A) £176.00
- [ ] B) £76.00
- [ ] C) £77.00
- [ ] D) £116.00
- [ ] E) £75.00

---

30 The cost of a hall hire, C pounds, is given by C = 30 + 5n, where n is the number of hours. What is the cost for 3 hours?

- [ ] A) £45.00
- [ ] B) £105.00
- [ ] C) £95.00
- [ ] D) £450.00
- [ ] E) £46.00

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31 Work out the value of 58 - 4n when n = 7.

- [ ] A) 11
- [ ] B) 86
- [ ] C) 30
- [ ] D) 61
- [ ] E) 378

---

32 Work out the value of 37 - 3n when n = 8.

- [ ] A) 14
- [ ] B) 272
- [ ] C) 26
- [ ] D) 42
- [ ] E) 13

---

33 The cost of a taxi, C pounds, is given by C = 25 + 2n, where n is the number of miles. What is the cost for 10 miles?

- [ ] A) £45.00
- [ ] B) £37.00
- [ ] C) £252.00
- [ ] D) £270.00
- [ ] E) £46.00

---

34 The cost of a party entertainer, C pounds, is given by C = 8 + 5n, where n is the number of children. What is the cost for 11 children?

- [ ] A) £24.00
- [ ] B) £93.00
- [ ] C) £64.00
- [ ] D) £63.00
- [ ] E) £143.00

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35 Work out the value of $3x + 3y$ when $x = 8$ and $y = 5$.

- [ ] A) 39
- [ ] B) 19
- [ ] C) 73
- [ ] D) 360
- [ ] E) 78

---

36 Work out the value of $9(n + 3)$ when $n = 9$.

- [ ] A) 107
- [ ] B) 108
- [ ] C) 21
- [ ] D) 90
- [ ] E) 84

---

37 The cost of a taxi, C pounds, is given by $C = 12 + 3n$, where n is the number of miles. What is the cost for 5 miles?

- [ ] A) £20.00
- [ ] B) £63.00
- [ ] C) £75.00
- [ ] D) £27.00
- [ ] E) £180.00

---

38 The cost of a taxi, C pounds, is given by $C = 30 + 2n$, where n is the number of miles. What is the cost for 13 miles?

- [ ] A) £56.00
- [ ] B) £416.00
- [ ] C) £780.00
- [ ] D) £392.00
- [ ] E) £57.00

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39 Work out the value of 51 - 5n when n = 5.

- [ ] A) 41
- [ ] B) 25
- [ ] C) 26
- [ ] D) 230
- [ ] E) 51

---

40 Work out the value of $7n^2 + 4$ when n = 5.

- [ ] A) 39
- [ ] B) 179
- [ ] C) 1,229
- [ ] D) 74
- [ ] E) 700

---

41 Work out the value of 7(n + 2) when n = 2.

- [ ] A) 11
- [ ] B) 27
- [ ] C) 28
- [ ] D) 16
- [ ] E) 74

---

42 Work out the value of 4(n + 4) when n = 5.

- [ ] A) 24
- [ ] B) 37
- [ ] C) 35
- [ ] D) 13
- [ ] E) 36

---

43 Work out the value of $5n^2 + 5$ when n = 7.

- [ ] A) 240
- [ ] B) 251
- [ ] C) 250
- [ ] D) 1,230
- [ ] E) 75

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44 Work out the value of $9n^2 + 7$ when $n = 8$.

- [ ] A) 151
- [ ] B) 583
- [ ] C) 79
- [ ] D) 5,191
- [ ] E) 569

---

45 Work out the value of $4n + 8$ when $n = 6$.

- [ ] A) 32
- [ ] B) 18
- [ ] C) 72
- [ ] D) 54
- [ ] E) 56

---

46 Work out the value of $2n + 8$ when $n = 3$.

- [ ] A) 14
- [ ] B) 30
- [ ] C) 13
- [ ] D) 15
- [ ] E) 31

---

47 Work out the value of $5(n + 7)$ when $n = 2$.

- [ ] A) 70
- [ ] B) 14
- [ ] C) 45
- [ ] D) 17
- [ ] E) 46

---

48 Work out the value of $5n^2 + 3$ when $n = 6$.

- [ ] A) 184
- [ ] B) 540
- [ ] C) 903
- [ ] D) 183
- [ ] E) 63

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49 Work out the value of 5x + 3y when x = 2 and y = 7.

- [ ] A) 41
- [ ] B) 89
- [ ] C) 30
- [ ] D) 72
- [ ] E) 31

---

50 Work out the value of 50 - 9n when n = 3.

- [ ] A) 43
- [ ] B) 23
- [ ] C) 44
- [ ] D) 22
- [ ] E) 123

---

51 The cost of a hall hire, C pounds, is given by C = 10 + 5n, where n is the number of hours. What is the cost for 9 hours?

- [ ] A) £56.00
- [ ] B) £55.00
- [ ] C) £95.00
- [ ] D) £24.00
- [ ] E) £135.00

---

52 The cost of a taxi, C pounds, is given by C = 15 + 5n, where n is the number of miles. What is the cost for 2 miles?

- [ ] A) £150.00
- [ ] B) £35.00
- [ ] C) £40.00
- [ ] D) £25.00
- [ ] E) £26.00

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53 The cost of a hall hire, C pounds, is given by C = 15 + 6n, where n is the number of hours. What is the cost for 5 hours?

- [ ] A) £46.00
- [ ] B) £105.00
- [ ] C) £45.00
- [ ] D) £81.00
- [ ] E) £26.00

---

54 Work out the value of 7x + 8y when x = 4 and y = 8.

- [ ] A) 91
- [ ] B) 180
- [ ] C) 88
- [ ] D) 93
- [ ] E) 92

---

55 Work out the value of 36 - 4n when n = 6.

- [ ] A) 192
- [ ] B) 10
- [ ] C) 38
- [ ] D) 12
- [ ] E) 13

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56 A car hire firm charges H = 25 + 15d where d is days hired. What is H for d = 3, in pounds?

- ☐ A) £40
- ☐ B) £55
- ☐ C) £70
- ☐ D) £45
- ☐ E) £35

---

57 The cost of a party entertainer, C pounds, is given by C = 20 + 5n, where n is the number of children. What is the cost for 10 children?

- ☐ A) £205
- ☐ B) £70
- ☐ C) £250
- ☐ D) £35
- ☐ E) £50

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Mark scheme · 2.108 Substitution and Formulae in Words: Test Pack

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

Question 1

substitution and bracket expansion seen for first part: 2(2 + 3 x 3) + 4 or equivalent **M1**

calculate first part to get Y = 26 or correct intermediate seen **M1**

second part b = 6 cao **A1**

Answer: First: Y = 2(2 + 3 x 3) + 4 = 2(2 + 9) + 4 = 2 x 11 + 4 = 22 + 4 = 26. Second: 48 = 2(4 + 3b) + 4 so 44 = 2(4 + 3b) so 22 = 4 + 3b and 3b = 18 giving b = 6.

Question 2

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

Answer: E) 28 cm

Question 3

correct option C (103) cao **B1**

Answer: C) 103

Question 4

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

Answer: E) 29

Question 5

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

Answer: D) 14

Question 6

correct option C (£57.00) cao **B1**

Answer: C) £57.00

Question 7

correct option D (£57.00) cao **B1**

Answer: D) £57.00

Question 8

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

Answer: E) 14

Question 9

correct option E (52) cao **B1**

Answer: E) 52

Question 10

substitute a = 3 to get t = 4 x 3 - 5 (= 7) seen **M1**

first answer t = 7 and second answer a = 4 cao **A1**

Answer: t = 7; when t = 11, 11 = 4a - 5 so 4a = 16 and a = 4.

Question 11

correct option E (£32.00) cao **B1**

Answer: E) £32.00

Question 12

correct option A (53) cao **B1**

Answer: A) 53

Question 13

correct option A (136) cao **B1**

Answer: A) 136

Question 14

correct option E (£82.00) cao **B1**

Answer: E) £82.00

Question 15

correct option C (£133.00) cao **B1**

Answer: C) £133.00

Question 16

correct option A (£66.00) cao **B1**

Answer: A) £66.00

Question 17

correct option A (22) cao **B1**

Answer: A) 22

Question 18

correct substitution for first part and rearrangement for second part seen **M1**

first answer 24 cm³ and second answer h = 4 cm cao **A1**

Answer: First: V = 2 x 3 x 4 = 24 cm^3. Second: 36 = 3 x 3 x h so h = 36 / 9 = 4 cm.

Question 19

correct option C (£20) cao **B1**

Answer: C) £20

Question 20

correct option C (20) cao **B1**

Answer: C) 20

Question 21

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

Answer: D) 29

Question 22

correct option E (120) cao **B1**

Answer: E) 120

Question 23

correct option D (£109.00) cao **B1**

Answer: D) £109.00

Question 24

correct option E (£97.00) cao **B1**

Answer: E) £97.00

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Question 25

correct option E (£49.00) cao **B1**

Answer: E) £49.00

Question 26

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

Answer: E) 17

Question 27

correct option B (70) cao **B1**

Answer: B) 70

Question 28

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

Answer: B) 18

Question 29

correct option B (£76.00) cao **B1**

Answer: B) £76.00

Question 30

correct option A (£45.00) cao **B1**

Answer: A) £45.00

Question 31

correct option C (30) cao **B1**

Answer: C) 30

Question 32

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

Answer: E) 13

Question 33

correct option A (£45.00) cao **B1**

Answer: A) £45.00

Question 34

correct option D (£63.00) cao **B1**

Answer: D) £63.00

Question 35

correct option A (39) cao **B1**

Answer: A) 39

Question 36

correct option B (108) cao **B1**

Answer: B) 108

Question 37

correct option D (£27.00) cao **B1**

Answer: D) £27.00

Question 38

correct option A (£56.00) cao **B1**

Answer: A) £56.00

Question 39

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

Answer: C) 26

Question 40

correct option B (179) cao **B1**

Answer: B) 179

Question 41

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

Answer: C) 28

Question 42

correct option E (36) cao **B1**

Answer: E) 36

Question 43

correct option C (250) cao **B1**

Answer: C) 250

Question 44

correct option B (583) cao **B1**

Answer: B) 583

Question 45

correct option A (32) cao **B1**

Answer: A) 32

Question 46

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

Answer: A) 14

Question 47

correct option C (45) cao **B1**

Answer: C) 45

Question 48

correct option D (183) cao **B1**

Answer: D) 183

Question 49

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

Answer: E) 31

Question 50

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

Answer: B) 23

Question 51

correct option B (£55.00) cao **B1**

Answer: B) £55.00

Question 52

correct option D (£25.00) cao **B1**

Answer: D) £25.00

Question 53

correct option C (£45.00) cao **B1**

Answer: C) £45.00

Question 54

correct option E (92) cao **B1**

Answer: E) 92

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Question 55

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

Answer: D) 12

Question 56

correct option C (£70) cao **B1**

Answer: C) £70 because 25 + 15 x 3 = 25 + 45 = 70.

Question 57

correct option B (£70) cao **B1**

Answer: B) £70

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