6.3 Algebra: Formulae, Sequences and Equations: 2-hour Pack

Calculators not allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Olu has 12 more marbles than Yusuf. Together they have 58 marbles.

How many marbles does Yusuf have?

Answer: ___

(2)

---

2 2 x ___ - 9 = 39

Answer: ___

(2)

---

3 a and b are positive whole numbers with a + b = 20.

How many different pairs (a, b) are there? Count (1, 19) and (19, 1) as different pairs.

Answer: ___

(2)

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4 a and b are whole numbers. a + b = 20 and a is 4 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

---

5 a and b are positive whole numbers. a + b = 24 and a x b is less than 144.

How many pairs (a, b) with a smaller than b satisfy both conditions?

Answer: ___

(3)

---

6 The nth term of a sequence is 7n + 7.

What is the 9th term?

Answer: ___

(2)

---

7 a and b are positive whole numbers with a + b = 9.

How many different pairs (a, b) are there? Count (1, 8) and (8, 1) as different pairs.

Answer: ___

(2)

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8 a and b are positive whole numbers. a + b = 25 and a x b is less than 100.

How many pairs (a, b) with a smaller than b satisfy both conditions?

Answer: ___

(3)

---

9 9 x ___ - 4 = 266

Answer: ___

(2)

---

10 The nth term of a sequence is 2n + 4.

What is the 24th term?

Answer: ___

(2)

---

11 Here is a sequence: 16, 20, 24, 28, 32, ...

The nth term is of the form 4n + b. Find the nth term.

Answer: ___

(2)

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12 Zara has 15 more marbles than Hana. Together they have 87 marbles.

How many marbles does Hana have?

Answer: ___

(2)

---

13 ___ divided by 6 = 7

Answer: ___

(1)

---

14 A regular shape has perimeter P = 4s, where s is the side length.

Work out P when s = 20.

Answer: ___

(1)

---

15 Two whole numbers have a sum of 11 and a product of 28.

What are the two numbers? Write the smaller one first.

Answer: ___ and ___

(2)

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16 Ella has x stamps. Zak has 4 times as many stamps as Ella.

Write an expression for the number of stamps Zak has.

Answer: ___

(1)

17 The nth term of a sequence is 6n - 2. Find the 5th term.

(2)

18 Two whole numbers have a sum of 7 and a product of 12.

What are the two numbers? Write the smaller one first.

Answer: ___ and ___

(2)

19 T = 5x + 5y.

Work out T when x = 5 and y = 6.

Answer: ___

(2)

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20 Simplify 6n + 7n.

Answer: ___

(1)

---

21 Solve 6x + 22 = 52.

Answer: x = ___

(2)

---

22 a and b are positive whole numbers with a + b = 11.

How many different pairs (a, b) are there? Count (1, 10) and (10, 1) as different pairs.

Answer: ___

(2)

---

23 T = 3x + 3y.

Work out T when x = 5 and y = 7.

Answer: ___

(2)

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24 a and b are positive whole numbers with a + b = 15.

How many different pairs (a, b) are there? Count (1, 14) and (14, 1) as different pairs.

Answer: ___

(2)

---

25 Solve 6x + 13 = 85.

Answer: x = ___

(2)

---

26 Solve 5x - 21 = 79.

Answer: x = ___

(2)

---

27 Simplify 8x + 7 + 3x + 8.

Answer: ___

(2)

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28 Uma has 29 more marbles than Callum. Together they have 77 marbles.

How many marbles does Callum have?

Answer: ___

(2)

---

29 Two whole numbers have a sum of 12 and a difference of 8.

What are the two numbers? Write the smaller one first.

Answer: ___ and ___

(2)

---

30 6 x ___ + 8 = 110

Answer: ___

(2)

---

31 Here is a sequence: 5, 7, 9, 11, 13, ...

The nth term is of the form 2n + b. Find the nth term.

Answer: ___

(2)

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32 5 x ___ + 15 = 45

Answer: ___

(2)

---

33 Bella has 21 more marbles than Victor. Together they have 45 marbles.

How many marbles does Victor have?

Answer: ___

(2)

---

34 ___ divided by 7 = 29

Answer: ___

(1)

---

35 A function machine adds 4.

What is the output when the input is 30?

Answer: ___

(1)

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36 Ben has 3 more marbles than Callum. Together they have 77 marbles.

How many marbles does Callum have?

Answer: ___

(2)

---

37 T = 5x + 5y.

Work out T when x = 6 and y = 3.

Answer: ___

(2)

---

38 Simplify 8x + 9 + 2x + 10.

Answer: ___

(2)

---

39 Quinn has 20 more marbles than Poppy. Together they have 96 marbles.

How many marbles does Poppy have?

Answer: ___

(2)

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40 Solve 4x - 22 = 26.

Answer: x = ___

(2)

---

41 Simplify 5x + 4x.

Answer: ___

(1)

---

42 The cost, C pounds, of hiring a bike for n hours is C = 3n + 15.

Work out C when n = 10.

Answer: £___

(2)

---

43 Simplify 3x + 9 + 8x + 10.

Answer: ___

(2)

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44 4 x ___ + 12 = 88

Answer: ___

(2)

---

45 Yusuf has 21 more marbles than Oscar. Together they have 67 marbles.

How many marbles does Oscar have?

Answer: ___

(2)

---

46 Simplify 2a + 6 + a + 7.

Answer: ___

(2)

---

47 T = 5x + 3y.

Work out T when x = 3 and y = 9.

Answer: ___

(2)

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48 Solve 8x + 22 = 182.

Answer: x = ___

(2)

---

49 Solve 6x - 5 = 67.

Answer: x = ___

(2)

---

50 Uma has 8 more marbles than Kofi. Together they have 62 marbles.

How many marbles does Kofi have?

Answer: ___

(2)

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Mark scheme · 6.3 Algebra: Formulae, Sequences and Equations: 2-hour Pack

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

Question 1

58 - 12 = 46 seen — M1
23 cao — A1
Answer: **23**

Question 2

39 + 9 = 48 seen — M1
24 cao — A1
Answer: **24**

Question 3

lists pairs systematically — M1
19 cao — A1
Answer: **19**

Question 4

forms or tests an equation — M1
a = 12, b = 8 cao — A1
Answer: **a = 12, b = 8**

Question 5

lists the pairs — M1
tests the product — M1
11 cao — A1
Answer: **11**

Question 6

7 x 9 seen — M1
70 cao — A1
Answer: **70**

Question 7

lists pairs systematically — M1
8 cao — A1
Answer: **8**

Question 8

lists the pairs — M1
tests the product — M1
4 cao — A1
Answer: **4**

Question 9

266 + 4 = 270 seen — M1
30 cao — A1
Answer: **30**

Question 10

2 x 24 seen — M1
52 cao — A1
Answer: **52**

Question 11

finds the common difference — M1
4n + 12 cao — A1
Answer: **4n + 12**

Question 12

87 - 15 = 72 seen — M1
36 cao — A1
Answer: **36**

Question 13

42 cao — B1
Answer: **42**

Question 14

80 cao — B1
Answer: **80**

Question 15

tests pairs that add to the sum — M1
4 and 7 cao — A1
Answer: **4 and 7**

Question 16

4x cao — B1
Answer: **4x**

Question 17

substitution n = 5 seen giving 6 x 5 - 2 — M1
28 cao — A1
Answer: **28**

Question 18

tests pairs that add to the sum — M1
3 and 4 cao — A1
Answer: **3 and 4**

Question 19

5 x 5 or 5 x 6 seen — M1
55 cao — A1
Answer: **55**

Question 20

13n cao — B1
Answer: **13n**

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Question 21

subtracts or divides first	M1
x = 5 cao	A1

Answer: **x = 5**

Question 22

lists pairs systematically	M1
10 cao	A1

Answer: **10**

Question 23

3 x 5 or 3 x 7 seen	M1
36 cao	A1

Answer: **36**

Question 24

lists pairs systematically	M1
14 cao	A1

Answer: **14**

Question 25

subtracts or divides first	M1
x = 12 cao	A1

Answer: **x = 12**

Question 26

adds or divides first	M1
x = 20 cao	A1

Answer: **x = 20**

Question 27

collects the v terms or the numbers	M1
11x + 15 cao	A1

Answer: **11x + 15**

Question 28

77 - 29 = 48 seen	M1
24 cao	A1

Answer: **24**

Question 29

tests pairs or halves the sum and difference	M1
2 and 10 cao	A1

Answer: **2 and 10**

Question 30

110 - 8 = 102 seen	M1
17 cao	A1

Answer: **17**

Question 31

finds the common difference	M1
2n + 3 cao	A1

Answer: **2n + 3**

Question 32

45 - 15 = 30 seen	M1
6 cao	A1

Answer: **6**

Question 33

45 - 21 = 24 seen	M1
12 cao	A1

Answer: **12**

Question 34

203 cao	B1

Answer: **203**

Question 35

34 cao	B1

Answer: **34**

Question 36

77 - 3 = 74 seen	M1
37 cao	A1

Answer: **37**

Question 37

5 x 6 or 5 x 3 seen	M1
45 cao	A1

Answer: **45**

Question 38

collects the v terms or the numbers	M1
10x + 19 cao	A1

Answer: **10x + 19**

Question 39

96 - 20 = 76 seen	M1
38 cao	A1

Answer: **38**

Question 40

adds or divides first	M1
x = 12 cao	A1

Answer: **x = 12**

Question 41

9x cao	B1

Answer: **9x**

Question 42

3 x 10 seen	M1
£45 cao	A1

Answer: **£45**

Question 43

collects the v terms or the numbers	M1
11x + 19 cao	A1

Answer: **11x + 19**

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Question 44

88 - 12 = 76 seen	M1
19 cao	A1

Answer: **19**

Question 45

67 - 21 = 46 seen	M1
23 cao	A1

Answer: **23**

Question 46

collects the v terms or the numbers	M1
3a + 13 cao	A1

Answer: **3a + 13**

Question 47

5 x 3 or 3 x 9 seen	M1
42 cao	A1

Answer: **42**

Question 48

subtracts or divides first	M1
x = 20 cao	A1

Answer: **x = 20**

Question 49

adds or divides first	M1
x = 12 cao	A1

Answer: **x = 12**

Question 50

62 - 8 = 54 seen	M1
27 cao	A1

Answer: **27**

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