6.3 Algebra: Formulae, Sequences and Equations: Test Pack

Calculators not allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write the next number in this sequence: 7, 10, 13, 16, ...

(1)

2 Simplify 2n + 8 + 3n + 9.

Answer: ___

(2)

3 ___ divided by 5 = 19

Answer: ___

(1)

4 Explain why the nth term 4n + 1 always gives an odd number. Give a short written explanation.

(3)

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5 T = 3x + 2y.

Work out T when x = 5 and y = 8.

Answer: ___

(2)

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6 Here is a sequence: 6, 9, 12, 15, 18, ...

Write the next two terms.

Answer: ___, ___

(2)

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7 The rule is: multiply by 2 then subtract 5. What is the output when the input is 9?

(2)

---

8 Solve this equation: 4 + 3x = 19. Find x.

(2)

---

9 A sequence is 5, 10, 20, 40. Explain whether this is an arithmetic sequence. Give a short explanation.

(2)

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10 Solve 6x + 15 = 117.

Answer: x = ___

(2)

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11 The nth term of a sequence is 2n + 6.

What is the 21st term?

Answer: ___

(2)

---

12 Solve 2x - 10 = 26.

Answer: x = ___

(2)

---

13 9 x ___ + 12 = 183

Answer: ___

(2)

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14 Priya has 27 more marbles than Ethan. Together they have 41 marbles.

How many marbles does Ethan have?

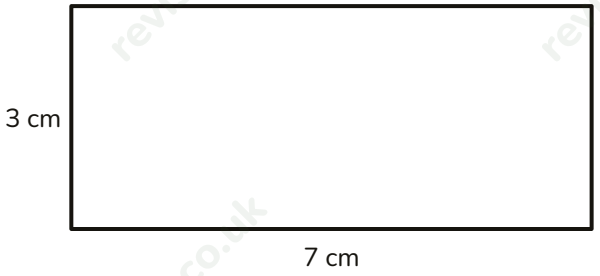
Answer: ___

(2)

---

15 A formula gives the perimeter P of a rectangle: P = 2(l + w). Lila has a rectangle with length 7 cm and width 3 cm. Use the formula to find the perimeter.

Diagram NOT accurately drawn



(3)

---

16 The rule for a sequence is: start at 16 and add 5 each time. The 1st term is 16.

What is the 27th term?

Answer: ___

(2)

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17 a and b are positive whole numbers. a + b = 24 and a x b is less than 120.

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

Answer: ___

(3)

---

18 Complete these equations. a + 8 = 21. Find a.
Then solve: 5b = 45. Find b.

(2)

---

19 A function machine adds 15.

The output is 31. What was the input?

Answer: ___

(1)

---

20 Sofia writes a rule: Take a number, subtract 6, then double the result. For input 10 she gets output 8. Check whether Sofia is correct and explain your answer.

(2)

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21 Write an equation for this word rule and then solve it: Three times a number minus 4 equals 11.

(2)

22 A function machine adds 14.

What is the output when the input is 10?

Answer: ___

(1)

23 A taxi charges £5 to start and £4 for each mile. A journey is n miles long.

Write an expression for the total cost in pounds.

Answer: ___

(2)

24 Simplify 3x + 7x.

Answer: ___

(1)

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Mark scheme · 6.3 Algebra: Formulae, Sequences and Equations: Test Pack

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

Question 1

19 cao — **B1**

Answer: **19**

Question 2

collects the v terms or the numbers — **M1**

5n + 17 cao — **A1**

Answer: **5n + 17**

Question 3

95 cao — **B1**

Answer: **95**

Question 4

states 4n is even (because 4 x n is multiple of 2) or equivalent — **M1**

adds 1 to even number gives odd (link made to 4n + 1) — **M1**

clear conclusion that 4n + 1 is odd for any integer n cao — **A1**

Answer: **Because 4n is always even (4n = 2 x 2n). Adding 1 to an even number gives an odd number, so 4n + 1 is always odd.**

Question 5

3 x 5 or 2 x 8 seen — **M1**

31 cao — **A1**

Answer: **31**

Question 6

identifies the rule — **M1**

21, 24 cao — **A1**

Answer: **21, 24**

Question 7

method: 9 x 2 = 18 then 18 - 5 — **M1**

13 cao — **A1**

Answer: **13**

Question 8

shows 3x = 15 or equivalent — **M1**

x = 5 cao — **A1**

Answer: **x = 5**

Question 9

states it is not arithmetic (differences are not equal) or equivalent — **B1**

gives reason eg differences 5, 10, 20 are not constant; sequence is geometric with ×2 — **B1**

Answer: **No. The differences are 5, 10 and 20 so they are not constant; it is a geometric sequence multiplying by 2.**

Question 10

subtracts or divides first — **M1**

x = 17 cao — **A1**

Answer: **x = 17**

Question 11

2 x 21 seen — **M1**

48 cao — **A1**

Answer: **48**

Question 12

adds or divides first — **M1**

x = 18 cao — **A1**

Answer: **x = 18**

Question 13

183 - 12 = 171 seen — **M1**

19 cao — **A1**

Answer: **19**

Question 14

41 - 27 = 14 seen — **M1**

7 cao — **A1**

Answer: **7**

Question 15

substitution seen: l + w = 7 + 3 or equivalent — **M1**

2 x (10) = 20 or equivalent working — **M1**

20 cm cao — **A1**

Answer: **20 cm**

Question 16

26 steps of 5 seen — **M1**

146 cao — **A1**

Answer: **146**

Question 17

lists the pairs — **M1**

tests the product — **M1**

7 cao — **A1**

Answer: **7**

Question 18

a = 13 cao — **B1**

b = 9 cao — **B1**

Answer: **a = 13; b = 9**

Question 19

16 cao — **B1**

Answer: **16**

Question 20

correct method: (10 - 6) x 2 = 4 x 2 = 8 or equivalent — **M1**

Yes; output is 8 with brief explanation cao — **A1**

Answer: **Yes. (10 - 6) x 2 = 8**

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Question 21

equation 3x - 4 = 11 or equivalent	**M1**
x = 5 cao	**A1**

Answer: **3x - 4 = 11; x = 5**

Question 22

24 cao	**B1**

Answer: **24**

Question 23

one correct term	**M1**
4n + 5 cao	**A1**

Answer: **4n + 5**

Question 24

10x cao	**B1**

Answer: **10x**

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