6.2 Pre-Algebra and Sequences: 2-hour Pack

National Curriculum (2014) Mathematics - KS2 Algebra (missing numbers, formulae, sequences) · Calculators not allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Freya has 24 more marbles than George. Together they have 34 marbles.

How many marbles does George have?

Answer: ___

(2)

---

2 Simplify 5x + 5x.

Answer: ___

(1)

---

3 Two whole numbers have a sum of 16 and a difference of 8.

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

Answer: ___ and ___

(2)

© Revision Library | revisionlibrary.co.uk

4 A function machine divides by 4.

What is the output when the input is 216?

Answer: ___

(1)

---

5 A function machine divides by 4 then adds 9.

What is the output when the input is 2016?

Answer: ___

(2)

---

6 a and b are whole numbers. a + b = 26 and a is 10 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

---

7 Simplify 6a + 7a.

Answer: ___

(1)

© Revision Library | revisionlibrary.co.uk

8 Simplify 7n + 6n.

Answer: ___

(1)

---

9 T = 4x + 4y.

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

Answer: ___

(2)

---

10 Willow has 27 more marbles than Hassan. Together they have 59 marbles.

How many marbles does Hassan have?

Answer: ___

(2)

---

11 a and b are whole numbers. a + b = 44 and a is 10 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

© Revision Library | revisionlibrary.co.uk

12 2 x ___ + 33 = 53

Answer: ___

(2)

---

13 a and b are whole numbers. a + b = 25 and a is 5 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

---

14 Here is a sequence: 20, 23, 26, 29, 32, ...

Write the next two terms.

Answer: ___, ___

(2)

---

15 A function machine divides by 4.

What is the output when the input is 1152?

Answer: ___

(1)

© Revision Library | revisionlibrary.co.uk

16 A function machine subtracts 7.

The output is 10. What was the input?

Answer: ___

(1)

---

17 7 x ___ - 30 = 61

Answer: ___

(2)

---

18 Ivan has t stickers. Zak has 3 more stickers than Ivan.

Write an expression for the number of stickers Zak has.

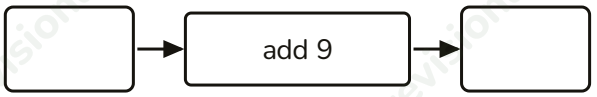
Answer: ___

(1)

© Revision Library | revisionlibrary.co.uk

19 A function machine adds 9 to the input.

Diagram NOT accurately drawn



(a) Find the output when the input is 3. **(1)**

(b) Find the output when the input is 8. **(1)**

(c) Find the output when the input is 15. **(1)**

---

20 T = 2x + 2y.

Work out T when x = 3 and y = 5.

Answer: ___

(2)

---

21 Solve 8x + 11 = 139.

Answer: x = ___

(2)

© Revision Library | revisionlibrary.co.uk

22 A pen costs 4p. Freya buys m pens.

Write an expression for the total cost in pence.

Answer: ___

(1)

---

23 ___ divided by 7 = 23

Answer: ___

(1)

---

24 Daisy has 11 more marbles than Jack. Together they have 91 marbles.

How many marbles does Jack have?

Answer: ___

(2)

---

25 The sum of 3 consecutive odd numbers is 189.

What is the smallest of the 3 numbers?

Answer: ___

(2)

© Revision Library | revisionlibrary.co.uk

26 a and b are positive whole numbers with a + b = 25.

How many different pairs (a, b) are there? Count (1, 24) and (24, 1) as different pairs.

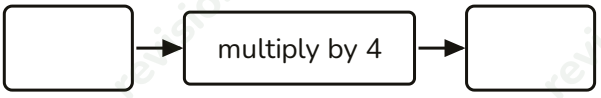
Answer: ___

(2)

---

27 A function machine multiplies the input by 4.

Diagram NOT accurately drawn



(a) The output is 12. Find the input. **(1)**

.....

(b) The output is 28. Find the input. **(1)**

.....

(c) The output is 40. Find the input. **(1)**

.....

---

28 Here is a sequence: 7, 12, 17, 22, 27, ...

The nth term is of the form 5n + b. Find the nth term.

Answer: ___

(2)

© Revision Library | revisionlibrary.co.uk

29 Simplify 2a + 3a.

Answer: ___

(1)

---

30 A function machine multiplies by 6.

What is the output when the input is 14?

Answer: ___

(1)

---

31 The sum of 3 consecutive even numbers is 132.

What is the smallest of the 3 numbers?

Answer: ___

(2)

---

32 The rule for a sequence is: start at 12 and add 5 each time. The 1st term is 12.

What is the 15th term?

Answer: ___

(2)

© Revision Library | revisionlibrary.co.uk

33 a and b are whole numbers. a + b = 21 and a is 9 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

---

34 Two whole numbers have a sum of 15 and a product of 50.

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

Answer: ___ and ___

(2)

---

35 ___ + 27 = 52

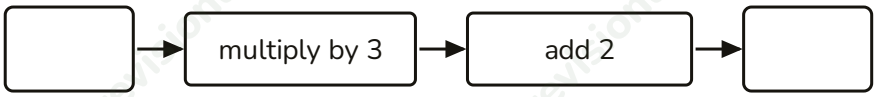
Answer: ___

(1)

© Revision Library | revisionlibrary.co.uk

36 A function machine multiplies the input by 3, then adds 2.

Diagram NOT accurately drawn



(a) Find the output when the input is 2. **(1)**

.....

(b) Find the output when the input is 5. **(1)**

.....

(c) Find the output when the input is 10. **(1)**

.....

37 Solve 8x - 20 = 92.

Answer: x = ___

(2)

38 The sum of 4 consecutive numbers is 102.

What is the smallest of the 4 numbers?

Answer: ___

(2)

© Revision Library | revisionlibrary.co.uk

39 Two whole numbers have a sum of 24 and a product of 144.

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

Answer: ___ and ___

(2)

---

40 Poppy has p stickers. Zak has 7 more stickers than Poppy.

Write an expression for the number of stickers Zak has.

Answer: ___

(1)

---

41 Two whole numbers have a sum of 15 and a product of 44.

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

Answer: ___ and ___

(2)

---

42 Find the missing number in this sequence.

554, 550, ___, 542, 538, 534

Answer: ___

(1)

© Revision Library | revisionlibrary.co.uk

43 3 x ___ - 30 = 45

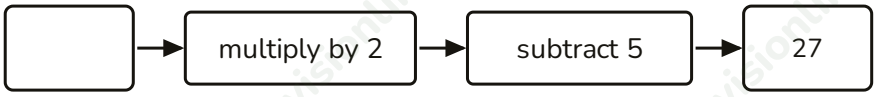
Answer: ___

(2)

---

44 A function machine multiplies the input by 2, then subtracts 5. The output is 27. Find the input.

Diagram NOT accurately drawn



(2)

---

45 The rule for a sequence is: start at 9 and add 9 each time. The 1st term is 9.

What is the 21st term?

Answer: ___

(2)

---

46 a and b are positive whole numbers. a + b = 16 and a x b is less than 80.

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

Answer: ___

(3)

© Revision Library | revisionlibrary.co.uk

47 Here is a sequence: 7, 16, 25, 34, 43, ...

The nth term is of the form 9n + b. Find the nth term.

Answer: ___

(2)

---

48 Solve 8x - 14 = 146.

Answer: x = ___

(2)

---

49 a and b are positive whole numbers. a + b = 20 and a x b is less than 60.

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

Answer: ___

(3)

© Revision Library | revisionlibrary.co.uk

50 Two whole numbers have a sum of 9 and a product of 20.

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

Answer: ___ and ___

(2)

---

51 a and b are positive whole numbers. a + b = 28 and a x b is less than 140.

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

Answer: ___

(3)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 6.2 Pre-Algebra and Sequences: 2-hour Pack

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

Question 1

34 - 24 = 10 seen — **M1**
5 cao — **A1**
Answer: **5**

Question 2

10x cao — **B1**
Answer: **10x**

Question 3

tests pairs or halves the sum and difference — **M1**
4 and 12 cao — **A1**
Answer: **4 and 12**

Question 4

54 cao — **B1**
Answer: **54**

Question 5

first operation applied correctly — **M1**
513 cao — **A1**
Answer: **513**

Question 6

forms or tests an equation — **M1**
a = 18, b = 8 cao — **A1**
Answer: **a = 18, b = 8**

Question 7

13a cao — **B1**
Answer: **13a**

Question 8

13n cao — **B1**
Answer: **13n**

Question 9

4 x 7 or 4 x 5 seen — **M1**
48 cao — **A1**
Answer: **48**

Question 10

59 - 27 = 32 seen — **M1**
16 cao — **A1**
Answer: **16**

Question 11

forms or tests an equation — **M1**
a = 27, b = 17 cao — **A1**
Answer: **a = 27, b = 17**

Question 12

53 - 33 = 20 seen — **M1**
10 cao — **A1**
Answer: **10**

Question 13

forms or tests an equation — **M1**
a = 15, b = 10 cao — **A1**
Answer: **a = 15, b = 10**

Question 14

identifies the rule — **M1**
35, 38 cao — **A1**
Answer: **35, 38**

Question 15

288 cao — **B1**
Answer: **288**

Question 16

17 cao — **B1**
Answer: **17**

Question 17

61 + 30 = 91 seen — **M1**
13 cao — **A1**
Answer: **13**

Question 18

t + 3 cao — **B1**
Answer: **t + 3**

Question 19

(a) 12 cao — **B1**
(a) Answer: **12**
(b) 17 cao — **B1**
(b) Answer: **17**
(c) 24 cao — **B1**
(c) Answer: **24**

Question 20

2 x 3 or 2 x 5 seen — **M1**
16 cao — **A1**
Answer: **16**

Question 21

subtracts or divides first — **M1**
x = 16 cao — **A1**
Answer: **x = 16**

Question 22

4m cao — **B1**
Answer: **4m**

© Revision Library | revisionlibrary.co.uk

Question 23

161 cao **B1**

Answer: **161**

Question 24

91 - 11 = 80 seen **M1**

40 cao **A1**

Answer: **40**

Question 25

uses the mean or tests numbers **M1**

61 cao **A1**

Answer: **61**

Question 26

lists pairs systematically **M1**

24 cao **A1**

Answer: **24**

Question 27

(a) 3 cao **B1**

(a) Answer: **3**

(b) 7 cao **B1**

(b) Answer: **7**

(c) 10 cao **B1**

(c) Answer: **10**

Question 28

finds the common difference **M1**

5n + 2 cao **A1**

Answer: **5n + 2**

Question 29

5a cao **B1**

Answer: **5a**

Question 30

84 cao **B1**

Answer: **84**

Question 31

uses the mean or tests numbers **M1**

42 cao **A1**

Answer: **42**

Question 32

14 steps of 5 seen **M1**

82 cao **A1**

Answer: **82**

Question 33

forms or tests an equation **M1**

a = 15, b = 6 cao **A1**

Answer: **a = 15, b = 6**

Question 34

tests pairs that add to the sum **M1**

5 and 10 cao **A1**

Answer: **5 and 10**

Question 35

25 cao **B1**

Answer: **25**

Question 36

(a) 8 cao **B1**

(a) Answer: **8**

(b) 17 cao **B1**

(b) Answer: **17**

(c) 32 cao **B1**

(c) Answer: **32**

Question 37

adds or divides first **M1**

x = 14 cao **A1**

Answer: **x = 14**

Question 38

uses the mean or tests numbers **M1**

24 cao **A1**

Answer: **24**

Question 39

tests pairs that add to the sum **M1**

12 and 12 cao **A1**

Answer: **12 and 12**

Question 40

p + 7 cao **B1**

Answer: **p + 7**

Question 41

tests pairs that add to the sum **M1**

4 and 11 cao **A1**

Answer: **4 and 11**

Question 42

546 cao **B1**

Answer: **546**

Question 43

45 + 30 = 75 seen **M1**

25 cao **A1**

Answer: **25**

Question 44

27 + 5 (= 32) seen, using the inverse operations in reverse order **M1**

16 cao **A1**

Answer: **16**

© Revision Library | revisionlibrary.co.uk

Question 45

20 steps of 9 seen	M1
189 cao	A1

Answer: **189**

Question 46

lists the pairs	M1
tests the product	M1
7 cao	A1

Answer: **7**

Question 47

finds the common difference	M1
9n - 2 cao	A1

Answer: **9n - 2**

Question 48

adds or divides first	M1
x = 20 cao	A1

Answer: **x = 20**

Question 49

lists the pairs	M1
tests the product	M1
3 cao	A1

Answer: **3**

Question 50

tests pairs that add to the sum	M1
4 and 5 cao	A1

Answer: **4 and 5**

Question 51

lists the pairs	M1
tests the product	M1
6 cao	A1

Answer: **6**

© Revision Library | revisionlibrary.co.uk