6.1 Introduction to Algebra: 2-hour Pack

Total Marks

NCETM National Curriculum (2014) Mathematics - KS2 Algebra · Calculators not allowed · about 120 minutes

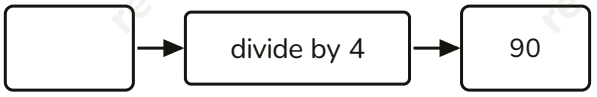
Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A function machine divides by 4.

The output is 90. What was the input?

Answer: ___



(1)

---

2 George has n marbles. Zak has 7 fewer marbles than George.

Write an expression for the number of marbles Zak has.

Answer: ___

(1)

---

3 Jade has 14 more marbles than Noah. Together they have 34 marbles.

How many marbles does Noah have?

Answer: ___

(2)

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4 Two whole numbers have a sum of 12 and a product of 20.

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

Answer: ___ and ___

(2)

---

5 Matchsticks are used to make a row of squares joined side by side. One square uses 4 sticks and each extra square added needs 3 more sticks.

How many sticks are needed for 12 squares?

Answer: ___



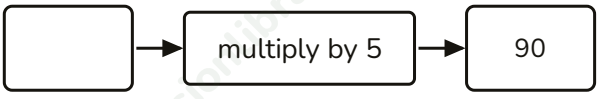
(2)

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6 A function machine multiplies by 5.

The output is 90. What was the input?

Answer: ___



(1)

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

What is the 13th term?

Answer: ___

(2)

---

8 A pen costs 9p. Noah buys m pens.

Write an expression for the total cost in pence.

Answer: ___

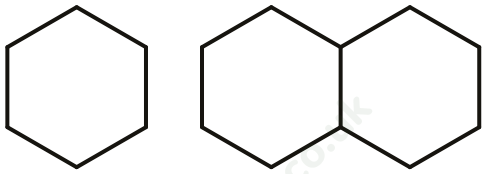
(1)

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9 Matchsticks are used to make a row of hexagons joined side by side. One hexagon uses 6 sticks and each extra hexagon added needs 5 more sticks.

How many sticks are needed for 5 hexagons?

Answer: ___



(2)

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10 Simplify 5x + 8x.

Answer: ___

(1)

---

11 a and b are positive whole numbers. a + b = 10 and a x b is less than 40.

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

Answer: ___

(3)

---

12 Solve 4x + 20 = 44.

Answer: x = ___

(2)

---

13 Kiran has 10 more marbles than Dev. Together they have 38 marbles.

How many marbles does Dev have?

Answer: ___

(2)

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14 a and b are positive whole numbers. a + b = 24 and a x b is less than 168.

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

Answer: ___

(3)

---

15 The cost, C pounds, of hiring a bike for n hours is C = 3n + 19.

Work out C when n = 15.

Answer: £___

(2)

---

16 Solve 7x + 20 = 125.

Answer: x = ___

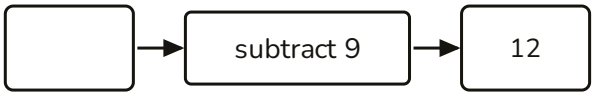
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17 A function machine subtracts 9.

The output is 12. What was the input?

Answer: ___



(1)

---

18 Matchsticks are used to make a row of triangles joined side by side. One triangle uses 3 sticks and each extra triangle added needs 2 more sticks.

How many sticks are needed for 6 triangles?

Answer: ___



(2)

---

19 A number a is found using a = 3n - 9.

Work out a when n = 12.

Answer: ___

(2)

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20 Here is a sequence: 8, 10, 12, 14, 16, ...

Write the next two terms.

Answer: ___, ___

(2)

---

21 a and b are positive whole numbers. a + b = 28 and a x b is less than 168.

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

Answer: ___

(3)

---

22 T = 4x + 5y.

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

Answer: ___

(2)

---

23 6 x ___ + 16 = 154

Answer: ___

(2)

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24 A number a is found using a = 3n - 6.

Work out a when n = 5.

Answer: ___

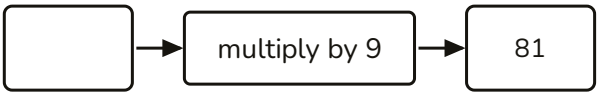
(2)

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25 A function machine multiplies by 9.

The output is 81. What was the input?

Answer: ___



(1)

---

26 a and b are whole numbers. a + b = 32 and a is 4 more than b.

Find a and b.

Answer: a = ___, b = ___

(2)

---

27 Solve 9x - 9 = 108.

Answer: x = ___

(2)

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28 Oscar has m stamps. Zak has 6 times as many stamps as Oscar.

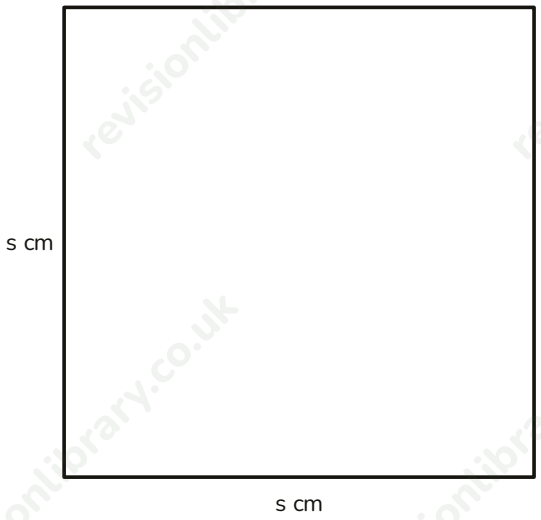
Write an expression for the number of stamps Zak has.

Answer: ___

(1)

29 A square has side length s cm.

Diagram NOT accurately drawn



(a) Write a formula for the perimeter, P, of the square in terms of s. **(1)**

(b) Use your formula to find P when s = 7 cm. **(1)**

30 ___ - 18 = 4

Answer: ___

(1)

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31 A number a is found using a = 3n - 5.

Work out a when n = 3.

Answer: ___

(2)

---

32 8 x ___ - 2 = 126

Answer: ___

(2)

---

33 Solve 8x + 3 = 27.

Answer: x = ___

(2)

---

34 Here is a sequence: 19, 23, 27, 31, 35, ...

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

Answer: ___

(2)

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35 A regular shape has perimeter P = 5s, where s is the side length.

Work out P when s = 2.

Answer: ___

(1)

---

36 Solve 9x - 11 = 7.

Answer: x = ___

(2)

---

37 Hana has t marbles. Zak has 8 fewer marbles than Hana.

Write an expression for the number of marbles Zak has.

Answer: ___

(1)

---

38 6 x ___ + 3 = 69

Answer: ___

(2)

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39 a and b are positive whole numbers with a + b = 28.

How many different pairs (a, b) are there? Count (1, 27) and (27, 1) as different pairs.

Answer: ___

(2)

---

40 Bella has 26 more marbles than Daisy. Together they have 62 marbles.

How many marbles does Daisy have?

Answer: ___

(2)

---

41 ___ - 9 = 0

Answer: ___

(1)

---

42 Two whole numbers have a sum of 6 and a difference of 2.

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

Answer: ___ and ___

(2)

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43 9 x ___ + 3 = 165

Answer: ___

(2)

---

44 Two whole numbers have a sum of 14 and a product of 48.

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

Answer: ___ and ___

(2)

---

45 Ivan has m stickers. Zak has 6 more stickers than Ivan.

Write an expression for the number of stickers Zak has.

Answer: ___

(1)

---

46 Matchsticks are used to make a row of triangles joined side by side. One triangle uses 3 sticks and each extra triangle added needs 2 more sticks.

How many sticks are needed for 9 triangles?

Answer: ___



(2)

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47 5 x ___ - 26 = 29

Answer: ___

(2)

---

48 A regular shape has perimeter P = 6s, where s is the side length.

Work out P when s = 19.

Answer: ___

(1)

---

49 A taxi charges £3 to start and £2 for each mile. A journey is n miles long.

Write an expression for the total cost in pounds.

Answer: ___

(2)

---

50 Solve 6x + 21 = 57.

Answer: x = ___

(2)

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51 8 x ___ - 28 = 196

Answer: ___

(2)

---

52 Sofia has 25 more marbles than Poppy. Together they have 99 marbles.

How many marbles does Poppy have?

Answer: ___

(2)

---

53 6 x ___ + 4 = 106

Answer: ___

(2)

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Mark scheme · 6.1 Introduction to Algebra: 2-hour Pack

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

Question 1

360 cao	B1

Answer: **360**

Question 2

n - 7 cao	B1

Answer: **n - 7**

Question 3

34 - 14 = 20 seen	M1
10 cao	A1

Answer: **10**

Question 4

tests pairs that add to the sum	M1
2 and 10 cao	A1

Answer: **2 and 10**

Question 5

11 extra shapes seen	M1
37 cao	A1

Answer: **37**

Question 6

18 cao	B1

Answer: **18**

Question 7

6 x 13 seen	M1
84 cao	A1

Answer: **84**

Question 8

9m cao	B1

Answer: **9m**

Question 9

4 extra shapes seen	M1
26 cao	A1

Answer: **26**

Question 10

13x cao	B1

Answer: **13x**

Question 11

lists the pairs	M1
tests the product	M1
4 cao	A1

Answer: **4**

Question 12

subtracts or divides first	M1
x = 6 cao	A1

Answer: **x = 6**

Question 13

38 - 10 = 28 seen	M1
14 cao	A1

Answer: **14**

Question 14

lists the pairs	M1
tests the product	M1
11 cao	A1

Answer: **11**

Question 15

3 x 15 seen	M1
£64 cao	A1

Answer: **£64**

Question 16

subtracts or divides first	M1
x = 15 cao	A1

Answer: **x = 15**

Question 17

21 cao	B1

Answer: **21**

Question 18

5 extra shapes seen	M1
13 cao	A1

Answer: **13**

Question 19

3 x 12 = 36 seen	M1
27 cao	A1

Answer: **27**

Question 20

identifies the rule	M1
18, 20 cao	A1

Answer: **18, 20**

Question 21

lists the pairs	M1
tests the product	M1
8 cao	A1

Answer: **8**

Question 22

4 x 5 or 5 x 6 seen	M1
50 cao	A1

Answer: **50**

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Question 23

154 - 16 = 138 seen **M1**
23 cao **A1**
Answer: **23**

Question 24

3 x 5 = 15 seen **M1**
9 cao **A1**
Answer: **9**

Question 25

9 cao **B1**
Answer: **9**

Question 26

forms or tests an equation **M1**
a = 18, b = 14 cao **A1**
Answer: **a = 18, b = 14**

Question 27

adds or divides first **M1**
x = 13 cao **A1**
Answer: **x = 13**

Question 28

6m cao **B1**
Answer: **6m**

Question 29

(a) P = 4s oe (e.g. P = s + s + s + s) **B1**
(a) Answer: **P = 4s**
(b) 28 (cm) cao, ft their formula from part (a) **B1**
(b) Answer: **28 cm**

Question 30

22 cao **B1**
Answer: **22**

Question 31

3 x 3 = 9 seen **M1**
4 cao **A1**
Answer: **4**

Question 32

126 + 2 = 128 seen **M1**
16 cao **A1**
Answer: **16**

Question 33

subtracts or divides first **M1**
x = 3 cao **A1**
Answer: **x = 3**

Question 34

finds the common difference **M1**
4n + 15 cao **A1**
Answer: **4n + 15**

Question 35

10 cao **B1**
Answer: **10**

Question 36

adds or divides first **M1**
x = 2 cao **A1**
Answer: **x = 2**

Question 37

t - 8 cao **B1**
Answer: **t - 8**

Question 38

69 - 3 = 66 seen **M1**
11 cao **A1**
Answer: **11**

Question 39

lists pairs systematically **M1**
27 cao **A1**
Answer: **27**

Question 40

62 - 26 = 36 seen **M1**
18 cao **A1**
Answer: **18**

Question 41

9 cao **B1**
Answer: **9**

Question 42

tests pairs or halves the sum and difference **M1**
2 and 4 cao **A1**
Answer: **2 and 4**

Question 43

165 - 3 = 162 seen **M1**
18 cao **A1**
Answer: **18**

Question 44

tests pairs that add to the sum **M1**
6 and 8 cao **A1**
Answer: **6 and 8**

Question 45

m + 6 cao **B1**
Answer: **m + 6**

Question 46

8 extra shapes seen **M1**
19 cao **A1**
Answer: **19**

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Question 47

29 + 26 = 55 seen	**M1**
11 cao	**A1**

Answer: **11**

Question 48

114 cao	**B1**

Answer: **114**

Question 49

one correct term	**M1**
2n + 3 cao	**A1**

Answer: **2n + 3**

Question 50

subtracts or divides first	**M1**
x = 6 cao	**A1**

Answer: **x = 6**

Question 51

196 + 28 = 224 seen	**M1**
28 cao	**A1**

Answer: **28**

Question 52

99 - 25 = 74 seen	**M1**
37 cao	**A1**

Answer: **37**

Question 53

106 - 4 = 102 seen	**M1**
17 cao	**A1**

Answer: **17**

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