2.14 Early Algebra: Test Pack

GL ASSESSMENT GL · Calculators not allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Simplify each expression by collecting like terms.

(a) 3a + 5a **(1)**

(b) 7b - 2b **(1)**

(c) 4c + 3c - c **(1)**

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2 x = 4 and y = 3. Work out the value of each expression.

(a) x + y **(1)**

(b) 2x - y **(1)**

(c) xy **(1)**

(d) x^2 **(1)**

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3 Solve $4(x + 3) = 24$.

(2)

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4 Simplify $4a + 3b + 2a - 5b$.

- ☐ A) $4ab$
- ☐ B) $6a + 8b$
- ☐ C) $6a + 3b$
- ☐ D) $6a - 2b$
- ☐ E) $8a - 2b$

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5 Here is a number sequence: 3, 7, 11, 15, ...

(a) Write down the next two terms of the sequence. **(2)**

.....

(b) Describe the term-to-term rule for the sequence. **(1)**

.....

(c) Calculate the 10th term of the sequence. **(2)**

.....

---

6 Solve $6x + 9 = 4x + 11$.

- ☐ A) 2
- ☐ B) 10
- ☐ C) 1
- ☐ D) 0.2
- ☐ E) -1

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7 Here is a number sequence: 2, 5, 8, 11, ...

(a) Find an expression, in terms of n, for the nth term of the sequence. **(2)**

.....

(b) Use your expression to find the 20th term of the sequence. **(1)**

.....

(c) Show that 100 is not a term in this sequence. **(2)**

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8 Simplify a + 6b + 3a - b.

- ☐ A) 9ab
- ☐ B) 4a + 7b
- ☐ C) 4a - 5b
- ☐ D) 3a + 5b
- ☐ E) 4a + 5b

---

9 Answer the following inequality questions.

(a) Solve $x + 4 < 9$. **(1)**

.....

(b) Solve $3x \geq 15$. **(1)**

.....

(c) List all the integer values of x that satisfy $-2 < x \leq 3$. **(2)**

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10 Factorise each expression fully.

(a) 6x + 9 **(1)**

(b) 4y - 12 **(1)**

(c) 10m + 15n **(1)**

---

11 Solve 9x - 5 = 94.

- ☐ A) 99
- ☐ B) 12
- ☐ C) 11
- ☐ D) 891
- ☐ E) 10

---

12 Priya thinks of a number. She multiplies it by 3, then adds 8. Her result is 29. Let n be Priya's number.

(a) Write down an equation in n to represent this information. **(1)**

.....

(b) Solve your equation to find n. **(2)**

.....

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13 Simplify 5a + b + 4a - 5b.

- ☐ A) 5ab
- ☐ B) 20a - 4b
- ☐ C) 9a + b
- ☐ D) 9a - 4b
- ☐ E) 9a + 6b

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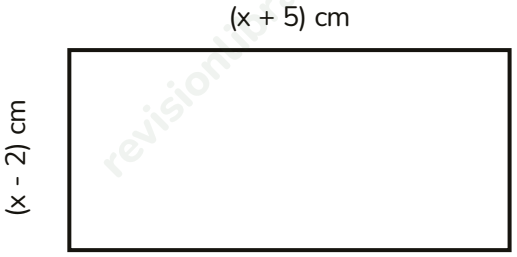
14 Simplify 5a + 4b + a - 7b.

- ☐ A) 6a - 3b
- ☐ B) 6a + 11b
- ☐ C) 3ab
- ☐ D) 6a + 3b
- ☐ E) 6a + 4b

---

15 A rectangle has length (x + 5) cm and width (x - 2) cm. The perimeter of the rectangle is 26 cm.

Diagram NOT accurately drawn



(not to scale)

(a) Show that 4x + 6 = 26. **(2)**

(b) Solve the equation to find the value of x. **(2)**

.....

(c) Find the length and the width of the rectangle. **(2)**

.....

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16 Simplify 4a + 9b + 6a - 2b.

- [ ] A) 10a + 7b
- [ ] B) 17ab
- [ ] C) 10a + 11b
- [ ] D) 10a + 9b
- [ ] E) 24a + 7b

---

17 Simplify 8a + 9b + 4a - 6b.

- [ ] A) 12a - 3b
- [ ] B) 12a + 3b
- [ ] C) 15ab
- [ ] D) 12a + 9b
- [ ] E) 12a + 15b

---

18 Simplify 4a + 5b + 6a - 7b.

- [ ] A) 8ab
- [ ] B) 10a - 2b
- [ ] C) 10a + 12b
- [ ] D) 24a - 2b
- [ ] E) 10a + 5b

---

19 Simplify 4a + 6b + 5a - 3b.

- [ ] A) 9a + 9b
- [ ] B) 9a - 3b
- [ ] C) 9a + 3b
- [ ] D) 9a + 6b
- [ ] E) 12ab

---

20 Solve 9x - 2 = 16.

- [ ] A) 1
- [ ] B) 3
- [ ] C) 2
- [ ] D) 18
- [ ] E) 162

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21 Simplify 4a + 7b + a - 5b.

- ☐ A) 5a + 12b
- ☐ B) 7ab
- ☐ C) 5a + 2b
- ☐ D) 4a + 2b
- ☐ E) 5a - 2b

---

22 Simplify 9a + 4b + 8a - 6b.

- ☐ A) 17a + 2b
- ☐ B) 17a + 10b
- ☐ C) 17a - 2b
- ☐ D) 15ab
- ☐ E) 72a - 2b

---

23 Write an expression for each statement. Use n or m for the unknown number as shown.

(a) 5 more than n **(1)**

.....

(b) double m, then subtract 3 **(1)**

.....

(c) the cost, in pounds, of x pens at 20p each **(1)**

.....

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24 Solve 6x + 12 = 66.

- ☐ A) 8
- ☐ B) 13
- ☐ C) 9
- ☐ D) -1
- ☐ E) 10

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25 Simplify 5a + 5b + 7a - 7b.

- ☐ A) 12a - 2b
- ☐ B) 12a + 12b
- ☐ C) 35a - 2b
- ☐ D) 12a + 2b
- ☐ E) 10ab

---

26 Simplify 9a + 4b + 7a - 6b.

- ☐ A) 16a - 2b
- ☐ B) 16a + 10b
- ☐ C) 14ab
- ☐ D) 16a + 2b
- ☐ E) 16a + 4b

---

27 Expand each expression.

(a) 3(x + 4) **(1)**

(b) 5(2y - 3) **(1)**

(c) -2(m + 6) **(1)**

---

28 Simplify 5a + 5b + 2a - 7b.

- ☐ A) 10a - 2b
- ☐ B) 7a - 2b
- ☐ C) 5ab
- ☐ D) 7a + 12b
- ☐ E) 7a + 5b

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29 Expand and simplify $3(x + 2) + 2(x - 5)$.

(2)

---

30 Solve $7x - 8 = -36$.

- ☐ A) -4
- ☐ B) -3
- ☐ C) -5
- ☐ D) -28
- ☐ E) -196

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Mark scheme · 2.14 Early Algebra: Test Pack

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

Question 1

(a) 8a cao **B1**

(a) Answer: 8a

(b) 5b cao **B1**

(b) Answer: 5b

(c) 6c cao **B1**

(c) Answer: 6c

Question 2

(a) 7 cao **B1**

(a) Answer: 7

(b) 5 cao **B1**

(b) Answer: 5

(c) 12 cao **B1**

(c) Answer: 12

(d) 16 cao **B1**

(d) Answer: 16

Question 3

4x + 12 = 24 seen, or 24/4 = 6 seen **M1**

x = 3 cao **A1**

Answer: x = 3

Question 4

correct option D (6a - 2b) cao **B1**

Answer: D) 6a - 2b

Question 5

(a) 19 cao **B1**

(a) 23 cao **B1**

(a) Answer: 19, 23

(b) add 4 (each time) oe **B1**

(b) Answer: add 4 each time

(c) correct method, e.g. nth term 4n - 1 found or sequence continued correctly to the 10th term **M1**

(c) 39 cao **A1**

(c) Answer: 39

Question 6

correct option C (1) cao **B1**

Answer: C) 1

Question 7

(a) common difference of 3 identified and used, e.g. 3n seen **M1**

(a) 3n - 1 oe cao **A1**

(a) Answer: 3n - 1

(b) 59 cao (ft from their nth term) **B1**

(b) Answer: 59

(c) 3n - 1 = 100 seen (ft), leading to n = 101/3 **M1**

(c) correct conclusion cso: n is not a whole number, so 100 is not a term **A1**

(c) Answer: 100 is not a term (n = 101/3, not a whole number)

Question 8

correct option E (4a + 5b) cao **B1**

Answer: E) 4a + 5b

Question 9

(a) x < 5 cao **B1**

(a) Answer: x < 5

(b) x ≥ 5 cao **B1**

(b) Answer: x ≥ 5

(c) end values used correctly (x = -1 included, x = 3 included) **B1**

(c) -1, 0, 1, 2, 3 all listed cao, no extras **B1**

(c) Answer: -1, 0, 1, 2, 3

Question 10

(a) 3(2x + 3) cao, fully factorised **B1**

(a) Answer: 3(2x + 3)

(b) 4(y - 3) cao, fully factorised **B1**

(b) Answer: 4(y - 3)

(c) 5(2m + 3n) cao, fully factorised **B1**

(c) Answer: 5(2m + 3n)

Question 11

correct option C (11) cao **B1**

Answer: C) 11

Question 12

(a) 3n + 8 = 29 oe **B1**

(a) Answer: 3n + 8 = 29

(b) 3n = 21 seen (ft from their equation) **M1**

(b) n = 7 cao **A1**

(b) Answer: n = 7

Question 13

correct option D (9a - 4b) cao **B1**

Answer: D) 9a - 4b

Question 14

correct option A (6a - 3b) cao **B1**

Answer: A) 6a - 3b

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Question 15

(a) 2[(x + 5) + (x - 2)] seen (correct perimeter expression) **M1**

(a) correctly simplified to 4x + 6 = 26 cso (answer given) **A1**

(a) Answer: 4x + 6 = 26 (shown)

(b) 4x = 20 seen **M1**

(b) x = 5 cao **A1**

(b) Answer: x = 5

(c) length = 10 cm cao (ft) **B1**

(c) width = 3 cm cao (ft) **B1**

(c) Answer: length = 10 cm, width = 3 cm

Question 16

correct option A (10a + 7b) cao **B1**

Answer: A) 10a + 7b

Question 17

correct option B (12a + 3b) cao **B1**

Answer: B) 12a + 3b

Question 18

correct option B (10a - 2b) cao **B1**

Answer: B) 10a - 2b

Question 19

correct option C (9a + 3b) cao **B1**

Answer: C) 9a + 3b

Question 20

correct option C (2) cao **B1**

Answer: C) 2

Question 21

correct option C (5a + 2b) cao **B1**

Answer: C) 5a + 2b

Question 22

correct option C (17a - 2b) cao **B1**

Answer: C) 17a - 2b

Question 23

(a) n + 5 oe **B1**

(a) Answer: n + 5

(b) 2m - 3 oe **B1**

(b) Answer: 2m - 3

(c) x/5 oe (accept 0.2x) **B1**

(c) Answer: x/5 (or 0.2x)

Question 24

correct option C (9) cao **B1**

Answer: C) 9

Question 25

correct option A (12a - 2b) cao **B1**

Answer: A) 12a - 2b

Question 26

correct option A (16a - 2b) cao **B1**

Answer: A) 16a - 2b

Question 27

(a) 3x + 12 cao **B1**

(a) Answer: 3x + 12

(b) 10y - 15 cao **B1**

(b) Answer: 10y - 15

(c) -2m - 12 cao **B1**

(c) Answer: -2m - 12

Question 28

correct option B (7a - 2b) cao **B1**

Answer: B) 7a - 2b

Question 29

3x + 6 + 2x - 10 seen (both brackets expanded correctly) **M1**

5x - 4 cao **A1**

Answer: 5x - 4

Question 30

correct option A (-4) cao **B1**

Answer: A) -4

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