2.4 Introduction to Algebraic Notation: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Simplify $9y^2 - 9y - 7y^2 - 7y - 3$.

(3)

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2 Here is an expression: -9y - 5b - 8

(a) How many terms does it have?

(b) Write down the coefficient of y.

(2)

---

3 Simplify 6c x 8n.

(2)

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4 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) m x 5 + d x 2

(b) m x d x 3

(2)

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5 Simplify $7c^2 - 7c + 5c^2 - 9c + 8$.

(3)

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6 Simplify $-4q + 3 - 3q + 7z - 8$.

(3)

---

7 Simplify $72ny \div 9y$.

(2)

---

8 Here is an expression: $-x + 2a - 8$

(a) How many terms does it have?

(b) Write down the coefficient of x.

(2)

---

9 Simplify $a + 3a - 7b - 6$.

(3)

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10 I think of a number, n. I subtract 7 and then divide the result by 8. Write an expression for the result.

(2)

11 Simplify 9y x 3y.

(2)

12 Here is an expression: 8b - 2m + 4
(a) How many terms does it have?
(b) Write down the coefficient of b.

(2)

13 Here is an expression: -8p - 7x - 1
(a) How many terms does it have?
(b) Write down the coefficient of p.

(2)

14 Is 5p + 7q + 5 an expression, an equation or a formula? Give a reason.

(2)

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15 Write each of these in a simpler form, without multiplication or division signs where possible.
(a) b x 5 + y x 2
(b) b x b x y x y

(2)

---

16 A pen costs m pence. Write an expression for the cost of 3 pens and a 3p ruler. Write an expression for the result.

(2)

---

17 I think of a number, n. I subtract 5 and then divide the result by 8. Write an expression for the result.

(2)

---

18 Simplify 7m + a - 4m + 7a.

(2)

---

19 Is -7m - 2q - 3 an expression, an equation or a formula? Give a reason.

(2)

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20 A pen costs n pence. Write an expression for the cost of 5 pens and a 9p ruler. Write an expression for the result.

(2)

21 Simplify 7z + 5x + 4z + 4x.

(2)

22 Write each of these in a simpler form, without multiplication or division signs where possible.
(a) c ÷ 2
(b) 2 x (c + p)

(2)

23 I think of a number, n. I subtract 6 and then divide the result by 7. Write an expression for the result.

(2)

24 I think of a number, x. I add 2 and then multiply the result by 7. Write an expression for the result.

(2)

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25 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) q + q + q

(b) q ÷ 6

(2)

---

26 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) 5 x (n + d)

(b) n ÷ 5

(2)

---

27 I think of a number, t. I multiply it by 6 and then add 8. Write an expression for the result.

.....

.....

(2)

---

28 Simplify each expression by collecting like terms. Show any simple arithmetic used.

(a) Simplify 4x + 2x + 3. **(2)**

(b) Simplify 8y - 3y - 2. **(1)**

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29 Here is an expression: 2y + 5b + 7

(a) Write down the constant term.

(b) Write down the coefficient of b.

(2)

---

30 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) q x q

(b) q ÷ 2

(2)

---

31 Simplify 9n - 4x - 7n + 5x.

(2)

---

32 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) c x p x 3

(b) c x 5 + p x 2

(2)

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33 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) z x z

(b) 2 x z x z x z

(2)

---

34 Here is an expression: 9b - 5y + 2

(a) How many terms does it have?

(b) Write down the coefficient of b.

(2)

---

35 Is -4a + 9y + 4 an expression, an equation or a formula? Give a reason.

(2)

---

36 Write each of these in a simpler form, without multiplication or division signs where possible.

(a) q x q

(b) q x q x d x d

(2)

---

37 Simplify 2q + 3x - 6q - x.

(2)

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38 Is -9n - 6x - 1 an expression, an equation or a formula? Give a reason.

(2)

39 Write an algebraic expression for each situation, using standard compact notation where appropriate.

(a) The total cost for n identical pens each costing £7. **(1)**

(b) A number x increased by 12 gives the total weight in kilograms. **(1)**

(c) Twice a number t minus 5. **(1)**

40 Write down the expression for: a number y increased by 8.

(1)

41 Write an algebraic expression for: three lots of a number w.

(2)

42 Simplify 5x + 3 + 2x - 7.

(3)

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43 Write down the expression for: five times a number m.

(1)

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44 State the coefficient of a in -5a + 3.

(1)

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Mark scheme · 2.4 Introduction to Algebraic Notation: 2-hour Pack

Question 1

collects at least one pair of like terms correctly **M1**
collects a second set of like terms correctly **M1**
$2y^2$ - 16y - 3 cao **A1**
Answer: **$2y^2$ - 16y - 3**

Question 2

(a) 3 **B1**
(b) -9 **B1**
Answer: **(a) 3, (b) -9**

Question 3

multiplies (or divides) the numbers correctly or the letters correctly **M1**
48cn cao **A1**
Answer: **48cn**

Question 4

(a) 5m + 2d **B1**
(b) 3md **B1**
Answer: **(a) 5m + 2d, (b) 3md**

Question 5

collects at least one pair of like terms correctly **M1**
collects a second set of like terms correctly **M1**
$12c^2$ - 16c + 8 cao **A1**
Answer: **$12c^2$ - 16c + 8**

Question 6

collects at least one pair of like terms correctly **M1**
collects a second set of like terms correctly **M1**
-7q + 7z - 5 cao **A1**
Answer: **-7q + 7z - 5**

Question 7

multiplies (or divides) the numbers correctly or the letters correctly **M1**
8n cao **A1**
Answer: **8n**

Question 8

(a) 3 **B1**
(b) -1 **B1**
Answer: **(a) 3, (b) -1**

Question 9

collects at least one pair of like terms correctly **M1**
collects a second set of like terms correctly **M1**
4a - 7b - 6 cao **A1**
Answer: **4a - 7b - 6**

Question 10

one correct operation applied to the letter, eg a product or a sum **M1**
(n - 7) ÷ 8 oe cao **A1**
Answer: **(n - 7) ÷ 8**

Question 11

multiplies (or divides) the numbers correctly or the letters correctly **M1**
$27y^2$ cao **A1**
Answer: **$27y^2$**

Question 12

(a) 3 **B1**
(b) 8 **B1**
Answer: **(a) 3, (b) 8**

Question 13

(a) 3 **B1**
(b) -8 **B1**
Answer: **(a) 3, (b) -8**

Question 14

Expression **B1**
reason: no equals sign **B1**
Answer: **Expression, because it has no equals sign**

Question 15

(a) 5b + 2y **B1**
(b) b^2y^2 **B1**
Answer: **(a) 5b + 2y, (b) b^2y^2**

Question 16

one correct operation applied to the letter, eg a product or a sum **M1**
3m + 3 oe cao **A1**
Answer: **3m + 3**

Question 17

one correct operation applied to the letter, eg a product or a sum **M1**
(n - 5) ÷ 8 oe cao **A1**
Answer: **(n - 5) ÷ 8**

Question 18

collects at least one pair of like terms correctly **M1**
3m + 8a cao **A1**
Answer: **3m + 8a**

Question 19

Expression **B1**
reason: no equals sign **B1**
Answer: **Expression, because it has no equals sign**

Question 20

one correct operation applied to the letter, eg a product or a sum **M1**
5n + 9 oe cao **A1**
Answer: **5n + 9**

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Question 21

collects at least one pair of like terms correctly **M1**
11z + 9x cao **A1**
Answer: **11z + 9x**

Question 22

(a) c/2 **B1**
(b) 2(c + p) **B1**
Answer: **(a) c/2, (b) 2(c + p)**

Question 23

one correct operation applied to the letter, eg a product or a sum **M1**
(n - 6) ÷ 7 oe cao **A1**
Answer: **(n - 6) ÷ 7**

Question 24

one correct operation applied to the letter, eg a product or a sum **M1**
7(x + 2) oe cao **A1**
Answer: **7(x + 2)**

Question 25

(a) 3q **B1**
(b) q/6 **B1**
Answer: **(a) 3q, (b) q/6**

Question 26

(a) 5(n + d) **B1**
(b) n/5 **B1**
Answer: **(a) 5(n + d), (b) n/5**

Question 27

one correct operation applied to the letter, eg a product or a sum **M1**
6t + 8 oe cao **A1**
Answer: **6t + 8**

Question 28

(a) adds like terms 4x and 2x to get 6x **M1**
(a) 6x + 3 cao **A1**
(a) Answer: **6x + 3**
(b) 5y - 2 cao **B1**
(b) Answer: **5y - 2**

Question 29

(a) 7 **B1**
(b) 5 **B1**
Answer: **(a) 7, (b) 5**

Question 30

(a) q^2 **B1**
(b) q/2 **B1**
Answer: **(a) q^2, (b) q/2**

Question 31

collects at least one pair of like terms correctly **M1**
2n + x cao **A1**
Answer: **2n + x**

Question 32

(a) 3cp **B1**
(b) 5c + 2p **B1**
Answer: **(a) 3cp, (b) 5c + 2p**

Question 33

(a) z^2 **B1**
(b) $2z^3$ **B1**
Answer: **(a) z^2, (b) $2z^3$**

Question 34

(a) 3 **B1**
(b) 9 **B1**
Answer: **(a) 3, (b) 9**

Question 35

Expression **B1**
reason: no equals sign **B1**
Answer: **Expression, because it has no equals sign**

Question 36

(a) q^2 **B1**
(b) q^2d^2 **B1**
Answer: **(a) q^2, (b) q^2d^2**

Question 37

collects at least one pair of like terms correctly **M1**
-4q + 2x cao **A1**
Answer: **-4q + 2x**

Question 38

Expression **B1**
reason: no equals sign **B1**
Answer: **Expression, because it has no equals sign**

Question 39

(a) 7n cao **B1**
(a) Answer: **7n**
(b) x + 12 cao **B1**
(b) Answer: **x + 12**
(c) 2t - 5 cao **B1**
(c) Answer: **2t - 5**

Question 40

y + 8 cao **B1**
Answer: **y + 8**

Question 41

recognises 'three lots of' means 3 times w **M1**
3w cao **A1**
Answer: **3w**

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Question 42

collects the x terms correctly, e.g. 5x + 2x = 7x	**M1**
collects the constants correctly, e.g. 3 - 7 = -4	**M1**
7x - 4 cao	**A1**

Answer: **7x - 4**

Question 43

5m cao	**B1**

Answer: **5m**

Question 44

-5 cao	**B1**

Answer: **-5**

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