

# 2.1

# Algebraic Expression

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8 (a) Solve  $3q = 42$

$q = \dots\dots\dots$   
(1)

(b) Solve  $18 - y = 6$

$y = \dots\dots\dots$   
(1)

(c) Solve  $\frac{k}{3} = 12$

$k = \dots\dots\dots$   
(1)

12

(b) Simplify  $6x - 7y + 3x + 5y$

$\dots\dots\dots$   
(2)

(d) Factorise  $25m + 30n$

$\dots\dots\dots$   
(1)

(e) Expand  $p(2p - 3)$

.....  
(1)

January 2018 2F

23 (a) Simplify fully  $\frac{y^5 \times y^8}{y^4}$

.....  
(2)

(b) Expand and simplify  $(x + 7)(x - 3)$

.....  
(2)

13

Here is a straight line  $ABCD$ .

Diagram **NOT**  
accurately drawn



$AB = x \text{ cm}$

$BC = 2AB$

$CD$  is 5 cm longer than  $AB$

The total length of the line  $ABCD$  is  $L$  cm.

- (c) Find an expression for  $L$  in terms of  $x$ .  
Give your answer in its simplest form.

$L = \dots\dots\dots$   
(3)

17 (a) Expand and simplify

$5(x + y) - 3x + 3y$

$\dots\dots\dots$   
(2)

(b) Simplify  $t^3 \times t^7$

$\dots\dots\dots$   
(1)

(c) Simplify  $(m^4)^3$

$\dots\dots\dots$   
(1)

9 (a) Simplify  $e + e + e + e$

.....  
(1)

(b) Simplify  $p \times 4 \times q$

.....  
(1)

(c) Simplify  $5x - 4y + 3x + 7y$

.....  
(2)

(d) Factorise  $4ab + 7a^2 - a$

.....  
(2)

(b) Expand and simplify  $(x + 3)(x - 6)$

---

(2)

(c) Simplify  $\frac{y^{12}}{y^4}$

---

(1)

(d) Simplify  $(3e)^2$

---

(2)

$$\frac{2^{11}}{2^2 \times 2^3} = 4^n$$

(e) Find the value of  $n$ .

---

(2)

5 (a) Simplify  $6x + 8x - 3x$

.....  
(1)

(b) Simplify  $4e \times 5f$

.....  
(1)

(e) Simplify  $10t + 4d - 3t + 2d$

.....  
(2)

16 (a) Simplify  $y^5 \times y^9$

.....  
(1)

(b) Simplify  $(2m^3)^4$

.....  
(2)

(d) (i) Factorise  $x^2 + 2x - 24$

.....  
(2)

8

(b) Expand and simplify  $x(2x + 1) + 3(x - 2) + 7$

.....  
(3)

18

(c) Factorise fully  $18e^2f^3 - 12e^3f$

.....  
(2)

24  $\frac{8}{2^7} = 2^n$

(a) Find the value of  $n$ .

$n = \dots\dots\dots$   
(2)

$(13^{-6})^4 \times 13^5 = 13^k$

(b) Find the value of  $k$ .

$k = \dots\dots\dots$   
(2)

8 (a) Simplify  $y \times y \times y$

.....  
(1)

(b) Simplify  $3c \times 2d$

.....  
(1)

(c) Simplify  $2k - 4k + 3k$

.....  
(1)

19 (a) Expand and simplify  $3(c - 7) + 2(3c + 4)$

.....  
(2)

(b) Expand and simplify  $(x + 7)(x - 2)$

.....  
(2)

(c) Factorise fully  $28y^2 - 21y$

.....  
(2)

21 (a) Simplify  $g^7 \times g^3$

.....  
(1)

(b) Simplify  $(k^3)^5$

.....  
(1)

(c) Simplify fully  $\frac{20x^2y^6}{4x^2y^2}$

.....  
(2)

8 (a) Simplify  $2e - 3f + 4e - 7f$

(2)

(b) Expand and simplify  $5(4x + 3) - (3x - 1)$

(2)

(c) Factorise fully  $4p + 6pq$

(2)

January 2019 1F

13 (a) Expand and simplify  $(e + 3)(e - 5)$

(2)

January 2019 2F

4 (a) Simplify  $4m + 2m - m$

(1)

(b) Simplify  $5p \times 7$

(1)

11

(c) Simplify  $p^8 \div p^3$

(1)

(d) Simplify  $n^0$

(1)

(e) Simplify  $(3x^2y^5)^3$

(2)

8 (a) Simplify  $5x + 4y - x - y$

(2)

11 (a) Factorise  $3x^2 - x$

(1)

(b) Expand  $4(2y + 3)$

(1)

25 (a) Factorise fully  $12d^2e + 16d^2e^2$

(2)

(b) Simplify fully  $\frac{15k^4m^3}{5km^2}$

(2)

June 2019 1F

6 (a) Simplify  $6e \times 2f$

.....  
(1)

(b) Simplify  $5m + 7k - 2m + k$

.....  
(2)

June 2019 1F

16

(b) Simplify  $e^9 \div e^5$

.....  
(1)

(c) Simplify  $(y^2)^8$

.....  
(1)

(d) Expand and simplify  $(x + 9)(x - 2)$

.....  
(2)

(e) Factorise fully  $16c^4p^2 + 20cp^3$

.....  
(2)

8 (a) Simplify  $a + a + a + a$

.....  
(1)

(b) Simplify  $3c \times 5c$

.....  
(1)

(c) Simplify  $3e + 7g + 5e - 4g$

.....  
(2)

(e) Factorise  $5y + 15$

.....  
(1)

22 (a) Simplify  $t^9 \div t^3$

.....  
(1)

(b) Simplify  $w^5 \times w^7$

.....  
(1)

(c) Simplify  $(5xy^2)^3$

.....  
(2)

13

(b) Expand  $w(w + 3)$

.....  
(1)

(d) Factorise  $x^2 - 5x - 36$

.....  
(2)

January 2020 1F

8 (a) Simplify  $6m - 2k + 5m - k$

.....  
(2)

21 (a) Expand and simplify  $(m - 8)(m + 5)$

.....  
(2)

(b) Factorise fully  $5y + 20y^2$

.....  
(2)

(c) Simplify  $(p^2 + 3)^0$

.....  
(1)

5 (a) Simplify  $10a \times b$

.....  
(1)

(b) Solve  $n + 3 = 7$

$n =$  .....  
(1)

January 2020 2F

13 (a) Expand  $x(5 - x)$

.....  
(1)

(b) Factorise  $3y - 21$

.....  
(1)

January 2020 2F

17 (a) Simplify  $\frac{x^9}{x^2}$

.....  
(1)

(b) Write  $\frac{7^8 \times 7^4}{7^3}$  as a single power of 7

.....  
(2)

January 2020 1FR

6 (a) Simplify  $3r \times 5t$

.....  
(1)

January 2020 1FR

16

(b) Factorise fully  $9ef - 12f$

.....  
(2)

(c) Expand and simplify  $(x + 2)(x - 5)$

.....  
(2)

(d) Simplify fully  $\frac{n^4 \times n^7}{n^5}$

.....  
(2)

12 (a) Simplify  $k + k + k + k$

$$f = 9 \times 9 \times 9 \times 9$$

.....  
(1)

(b) (i) Write  $f$  as a single power of 9

(ii) Write  $f$  as a single power of 3

.....  
(2)

(c) Write  $5^{17} \times 5^2$  as a single power of 5

.....  
(1)

18 (a) Expand  $e(3e - 5)$

.....  
(1)

(b) Factorise  $35 + 5f$

.....  
(1)

(c) Simplify  $(4pq^2)^3$

.....  
(2)

7 (a) Simplify  $5c \times d$

.....  
(1)

(d) Simplify  $8k + 5m - 2k + 6m$

.....  
(2)

(e) Expand  $4(3g + 1)$

.....  
(1)

20

(b) Factorise fully  $16m^3g^3 + 24m^2g^5$

.....  
(2)

(c) (i) Factorise  $y^2 - 2y - 48$

.....  
(2)

June 2020 2F

14 (a) Factorise  $25f - 10$

.....  
(1)

June 2020 2F

21 (a) Simplify  $g^6 \times g^4$

.....  
(1)

(b) Simplify  $(3cd^4)^2$

.....  
(2)

January 2021 1F

7 (a) Simplify  $10x + 4y + 3x - 6y$

.....  
(2)

January 2021 1F

12 (a) Expand  $x(4 - x)$

.....  
(1)

25 (a) Simplify  $(2x^3y^5)^4$

.....  
(2)

(b) (i) Factorise  $x^2 + 5x - 36$

.....  
(2)

7 (a) Simplify  $p + p + p + p + p + p$

.....  
(1)

(b) Simplify  $5y^2 + 6y^2 - 3y^2$

.....  
(1)

(c) Simplify  $e \times e \times e \times e \times e$

.....  
(1)

(d) Simplify  $5c \times 4d$

.....  
(1)

January 2021 2F

19 (a) Expand and simplify  $4x(2x + 5) - 3x(2x - 3)$

.....  
(2)

Given that  $\frac{y^5 \times y^n}{y^6} = y^{13}$

(b) work out the value of  $n$ .

$n =$  .....  
(2)

January 2021 2F

20 (a) Write down the value of  $y^0$

.....  
(1)

January 2021 1FR

8 (a) Simplify  $a \times a \times a \times a$

.....  
(1)

(b) Simplify  $4b \times 5c$

.....  
(1)

(c) Simplify  $6d + 2e + d - 5e$

.....  
(2)

15 (a) Expand  $5(3a + 4)$

.....  
(1)

(b) Factorise  $4c - 14$

.....  
(1)

21

(b) Write down the value of  $g^0$

.....  
(1)

(c) Factorise  $x^2 - 11x + 24$

.....  
(2)

11 (b) Factorise fully  $8p^2 - 2p$

.....  
(2)

(c) Expand  $4t(3t - 2)$

.....  
(2)

(d) Expand and simplify  $(5x - 2)(x + 4)$

.....  
(2)

15 (a) Simplify  $(3k^2)^4$

.....  
(2)

(b) Simplify  $(21m^4n) \div (3n^{-5})$

.....  
(2)

June 2021 1F

4 (a) Simplify  $3 \times 10d$

.....  
(1)

(b) Simplify  $8e + e - 5e$

.....  
(1)

June 2021 1F

20 (a) Expand and simplify  $3x(2x + 3) - x(3x + 5)$

.....  
(2)

Given that  $\frac{w^5 \times w^n}{w^3} = w^{10}$

(c) work out the value of  $n$ .

$n =$  .....  
(2)

24 (a) Factorise fully  $25a^4c^7d + 45a^9c^3h$

.....  
(2)

June 2021 2F

8 (a) Simplify  $w \times w \times w \times w \times w$

.....  
(1)

(b) Simplify  $5a \times 3c$

.....  
(1)

(c) Simplify  $3e + 2f - e + 5f$

.....  
(2)

June 2021 2F

23 (i) Factorise  $x^2 + 2x - 24$

.....  
(2)

7

(b) Simplify  $3a \times 8b$

.....  
(1)

(c) Simplify  $8w - 4y + w - 3y$

.....  
(2)

(d) Factorise fully  $16 + 12t$

.....  
(2)

13 (a) Simplify  $e^8 \div e^2$

.....  
(1)

(b) Expand and simplify  $(x - 3)(x + 1)$

.....  
(2)

November 2021 2F

3 (a) Simplify  $4x + 5x - 2x$

.....  
(1)

(b) Simplify  $4p \times 7$

.....  
(1)

November 2021 2F

17 (a) Write down the value of  $m$ , given that  $3^4 \times 3^5 = 3^m$

$m =$  .....  
(1)

(b) Write down the value of  $n$ , given that  $(5^3)^7 = 5^n$

$n =$  .....  
(1)

(c) Find the value of  $p$ , given that  $\frac{7^8 \times 7^2}{7^p} = 7^6$

$p =$  .....  
(2)

November 2021 2F

24 (a) Simplify  $(3x^2y)^0$

.....  
(1)

(b) (i) Factorise  $x^2 - 5x - 36$

.....  
(2)

7

(c) Simplify  $h + h + h + h + h$

.....  
(1)

(d) Simplify  $5a + 7f - 2a + 4f$

.....  
(2)

16 (a) Simplify  $a^7 \times a^4$

.....  
(1)

(b) Simplify  $w^{15} \div w^3$

.....  
(1)

(c) Simplify  $(8x^5y^3)^2$

.....  
(2)

21

(b) (i) Factorise  $y^2 - 2y - 35$

.....  
(2)

16 (a) Expand and simplify  $x(2x - 3) + 7(2x + 1) - 5$

.....  
(3)

(b) Expand and simplify  $(y + 4)(2 - y)$

.....  
(2)

(c) Factorise fully  $15b^5c - 35b^3c^9$

.....  
(2)

January 2022 1FR

7 (a) Simplify  $3c + 5d - c + 2d$

.....  
(2)

(b) Simplify  $8e \times 5f$

.....  
(1)

January 2022 1FR

13 (a) Factorise  $6x - 15$

.....  
(1)

23 (a) Simplify  $x^4 \times x^5$

.....  
(1)

(b) Simplify  $(4y^2)^3$

.....  
(2)

(c) Factorise  $n^2 - 7n + 12$

.....  
(2)

15

(b) Expand  $x(8 - x)$

.....  
(1)

January 2022 2FR

23 (a) Write down the value of  $x^0$

.....  
(1)

Given that  $2^{-3} \times 2^9 = 2^n$

(b) find the value of  $n$

$n =$  .....  
(1)

Given that  $\frac{7^{206} \times 7^m}{7^{214}} = 7^{-3}$

(c) find the value of  $m$

$m =$  .....  
(2)

June 2022 1F

2 (a) Simplify  $12a + 3a - 7a$

.....  
(1)

(b) Simplify  $8 \times 3b$

.....  
(1)

June 2022 1F

8 (a) Simplify  $12g - 8e - 5g + 6e$

.....  
(2)

June 2022 1F

20 (a) Expand and simplify  $(n - 6)(n + 4)$

.....  
(2)

24 (a) Simplify  $8 \times (4t)^0$

.....  
(1)

$$x^6 \div x^{-5} = x^p$$

(b) Find the value of  $p$

$p =$  .....  
(1)

(c) Simplify fully  $(2k^2m^4)^3$

.....  
(2)

June 2022 2F

11 (a) Simplify  $c \times c \times c \times c \times c \times c$

.....  
(1)

(b) Simplify  $2h^3 + 5h^3 - h^3$

.....  
(1)

(c) Expand  $x(x + 5)$

.....  
(1)

(d) Factorise  $9y - 12$

.....  
(1)

June 2022 2F

27 (i) Factorise  $x^2 + 5x - 24$

.....  
(2)

June 2022 1FR

9 (a) Simplify  $6p + 2t + p - 3t$

.....  
(2)

June 2022 1FR

21 (a) Expand  $3c^3(c + 4)$

.....  
(2)

(b) (i) Factorise  $x^2 + 8x - 9$

.....  
(2)

9 (a) Simplify  $a \times a \times a \times a \times a$

.....  
(1)

(b) Simplify  $8b \times 3c$

.....  
(1)

(c) Expand  $3(x + 4)$

.....  
(1)

23

(b) Simplify  $a^0$  where  $a > 0$

.....  
(1)

(c) Simplify fully  $\frac{3xy^3}{6x^2y}$

.....  
(2)

(d) Factorise fully  $10c^3d^2 + 15cd^4$

.....  
(2)

24  $\frac{2^k}{4^n} = 2^x$

Find an expression for  $x$  in terms of  $k$  and  $n$

$x = \dots\dots\dots$

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(Total for Question 24 is 2 marks)

---

7 (a) Simplify  $5p \times 9k$

$\dots\dots\dots$   
(1)

(b) Simplify  $3e + 2f + 8e - 7f$

$\dots\dots\dots$   
(2)

7 (a) Simplify  $c \times c \times c \times c \times c$

.....  
(1)

(d) Expand  $5(2 + 3h)$

.....  
(1)

(e) Factorise  $g^2 + 7g$

.....  
(1)

24 (a) Write down the value of  $(m + 2)^0$  where  $m$  is a positive integer.

.....  
(1)

(b) Simplify  $(3a^2b^4)^3$

.....  
(2)

(c) Factorise fully  $14x^2y^4 + 21x^3y^2$

.....  
(2)

4 (a) Simplify  $10y - y$

.....  
(1)

(b) Simplify  $3p \times 4p$

.....  
(1)

(e) Simplify  $8c + 5d - 2c - 3d$

.....  
(2)

18 (a) Simplify  $w^{12} \div w^3$

.....  
(1)

(b) Simplify  $5m^4p^2 \times 2m^3p$

.....  
(2)

January 2023 1FR

23 (a) Factorise fully  $18c^3d^2 - 21c^2$

.....  
(2)

(b) (i) Factorise  $y^2 - 3y - 18$

.....  
(2)

January 2023 2FR

14 (a) Expand  $x(10 - x)$

.....  
(1)

(b) Factorise  $6y + 27$

.....  
(1)

5 (a) Simplify  $p + p + p + p$

.....  
(1)

(b) Simplify  $5e + 6f + 7e - 2f$

.....  
(2)

21 (a) Simplify  $(2c^4d^7)^3$

.....  
(2)

(b) Find the value of  $5y^0$  where  $y > 0$

.....  
(1)

(c) Factorise fully  $16a^2b^3 + 20a^3b$

.....  
(2)

(d) (i) Factorise  $x^2 + 9x - 22$

.....  
(2)

June 2023 2F

13 (a) Expand  $x(3 - x)$

.....  
(1)

(b) Factorise fully  $12a - 18b$

.....  
(2)

June 2023 2FR

16 (a) Factorise  $6y - 27$

.....  
(1)

(b) Expand  $p(p - 2)$

.....  
(1)

(e) Expand and simplify  $(x + 5)(x - 7)$

.....  
(2)

22 (a) Simplify  $(4^{-2})^0$

.....  
(1)

$$3^{-14} \times 3^8 = 3^m$$

(b) Find the value of  $m$

$m =$  .....  
(1)

November 2023 1F

7 (a) Simplify  $9d \times 5c$

.....  
(1)

(b) Simplify  $7p + 5n - 9p + 3n$

.....  
(2)

November 2023 1F

16 (a) Factorise fully  $12pq - 18p$

.....  
(2)

12 (a) Expand  $x(x + 3)$

.....  
(1)

(b) Factorise  $8p + 10$

.....  
(1)

20

(b) Simplify  $h^{15} \div h^3$

.....  
(1)

(c) Simplify fully  $(2g^3k^5)^4$

.....  
(2)

(d) Given that  $\frac{y^5 \times y^n}{y^7} = y^{12}$   
work out the value of  $n$

$n =$  .....  
(2)