

Algebraic expressions

Foundation and Higher tiers | Total marks: 76

Marks

- M** Method mark, for a correct method. It can be implied by a correct answer.
- A** Accuracy mark, for a correct answer. It needs the method mark before it.
- B** A mark for a correct value or statement, with or without working.
- ft** Follow through: the mark is given for using an earlier wrong answer correctly.
- oe** Or equivalent.
- [a, b]** Any value from a to b inclusive.

Questions

Q	Skill	Spec	Tier	Grade	Calculator	Marks
1	Algebraic notation	A1	Foundation	1	No	2
2	Collecting like terms and simplifying products	A4	Foundation	2	No	3
3	Expressions, equations, formulae and identities	A3	Common	3	No	2
4	Substituting a negative number	A2	Foundation	3	No	3
5	Writing expressions from a context	A21 A1	Common	3	No	3
6	Laws of indices	A4	Foundation	3	No	3
7	Multiplying and dividing terms with powers	A4	Foundation	4	No	4
8	Perimeter as a simplified expression	A4	Foundation	4	No	2
9	Substituting a negative into a square	A2	Foundation	4	No	2
10	Area as a simplified expression	A4	Foundation	4	No	2
11	Powers of a term	A4	Foundation	5	No	2
12	Laws of indices, finding a power	A4	Foundation	5	No	2
13	Fractional powers of a term	A4 N7	Higher	7	No	2
14	Substituting decimals into an expression	A2	Foundation	2	Yes	2
15	Substituting decimals and a negative into an expression	A2	Foundation	2	Yes	3
16	Simplifying with decimal coefficients	A4	Foundation	2	Yes	2

Q	Skill	Spec	Tier	Grade	Calculator	Marks
17	Substituting a negative decimal	A2	Foundation	2	Yes	2
18	Perimeter as an expression, then evaluated	A4 A2	Foundation	2	Yes	3
19	Algebraic notation: x squared and 2x	A1 A2	Foundation	2	Yes	2
20	Notation: products and quotients	A1 A2	Foundation	2	Yes	2
21	Substituting into an expression with a square root	A2	Foundation	2	Yes	2
22	Number machines and expressions	A1 A2	Foundation	2	Yes	2
23	Writing and using an expression in context	A21 A2	Common	3	Yes	5
24	Substituting a negative into a square	A2	Foundation	3	Yes	3
25	Substituting into two expressions	A2	Foundation	3	Yes	2
26	Comparing expressions by substituting	A1 A2	Foundation	3	Yes	2
27	Substituting into a cubed bracket	A2	Foundation	3	Yes	2
28	Writing an expression with a change of units	A21 A2	Common	3	Yes	3
29	Expanding a bracket for an area, then solving	A4 A17	Foundation	3	Yes	4
30	Substitution with a calculator	A2	Foundation	4	Yes	3
	Total					76

Question 1 A1 · Foundation · Grade 1 · 2 marks

Q	Answer	Mark	Comments
1(a)	$5t$	B1	
1(b)	$3y^2$	B1	

Question 2 A4 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
2(a)	$7m + n - 3$	B2	any order. B1 for two of $7m$, $+n$, -3 in an expression
2(b)	$12gh$	B1	accept $12hg$

Question 3 A3 · Common · Grade 3 · 2 marks

Q	Answer	Mark	Comments
3	$5(n - 2) = 5n - 10$: identity; $8k - k^2$: expression; $C = 25 + 12h$: formula; $6w + 1 = 19$: equation	B2	B1 for two or three rows correct

Question 4 A2 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
4(a)	27	B1	
4(b)	$16 + 2 \times 4 \times -3$ or $16 - 24$	M1	oe
	-8	A1	

Question 5 A21A1 · Common · Grade 3 · 3 marks

Q	Answer	Mark	Comments
5(a)	$3s + 5t$	B1	oe
5(b)	$500 - 3s - 5t$	B2	oe, such as $500 - (3s + 5t)$. B1 for $500 -$ their (a), or for $5 - 3s - 5t$

Question 6 A4 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
6(a)	m^8	B1	
6(b)	w^6	B1	
6(c)	h^{12}	B1	

Question 7 A4 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
7(a)	$15a^3b^5$	B2	B1 for two of 15, a^3 , b^5 in a product
7(b)	$4x^4y$	B2	B1 for two of 4, x^4 , y in a product

Question 8 A4 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
8	$4y - 1 + y + 6 + 4y - 1 + y + 6$ or $2(4y - 1) + 2(y + 6)$	M1	oe
	$10y + 10 = 10(y + 1)$	A1	with $10y + 10$ seen

Question 9 A2 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
9	$(-3)^2 = 9$ or $-3 \times -3 = 9$	M1	oe
	No and 13	A1	

Question 10 A4 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
10	$6a \times 4b$ or $24ab$ or $a \times 2b$ or $2ab$	M1	oe, or splits the shape into two rectangles, such as $20ab$ and $2ab$
	$22ab$	A1	

Question 11 A4 · Foundation · Grade 5 · 2 marks

Q	Answer	Mark	Comments
11	$3 \times 3 \times 3$ or 3^3 or 27	M1	or shows $3x^2 \times 3x^2 \times 3x^2$
	No and $27x^6$	A1	

Question 12 A4 · Foundation · Grade 5 · 2 marks

Q	Answer	Mark	Comments
12	$2n + 3 = 15$	M1	oe, or x^{12} seen
	6	A1	

Question 13 A4 N7 · Higher · Grade 7 · 2 marks

Q	Answer	Mark	Comments
13	$16a^4b^6$	B2	B1 for two of 16, a^4 , b^6 in a product, or for $4a^2b^3$ seen

Question 14 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
14	5×6.35 or 31.75 , or 2×4.8 or 9.6	M1	
	22.15	A1	

Question 15 A2 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
15	1.85	B1	when $n = 1.5$
	7.37	B1	when $n = 3.8$
	-7.75	B1	when $n = -2.5$

Question 16 A4 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
16(a)	4.18a	B1	
16(b)	4.1xy	B1	accept 4.1yx

Question 17 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
17	$6 - 4 \times -2.35$ or $6 + 9.4$	M1	oe
	15.4	A1	

Question 18 A4 A2 · Foundation · Grade 2 · 3 marks

Q	Answer	Mark	Comments
18(a)	$2a + b$	B1	accept $b + 2a$
18(b)	$2 \times 6.85 + 5.37$ or $13.7 + 5.37$	M1	oe
	19.07	A1	

Question 19 A1 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
19	3.4225 or 3.7 seen	M1	
	3.4225 and 3.7 with a correct statement	A1	such as $3.4225 < 3.7$

Question 20 A1 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
20(a)	5.67	B1	
20(b)	28	B1	

Question 21 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
21	$\sqrt{13.69} = 3.7$ or 14.8 seen	M1	
	13.2	A1	

Question 22 A1 A2 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
22(a)	$2.6x - 0.75$	B1	oe, such as $x \times 2.6 - 0.75$
22(b)	10.56	B1	

Question 23 A21 A2 · Common · Grade 3 · 5 marks

Q	Answer	Mark	Comments
23(a)	$12.5 - 0.35k$	B1	oe
23(b)	$12.5 - 0.35 \times 23$ or $12.5 - 8.05$	M1	oe
	4.45	A1	accept 445 cm
23(c)	$12.5 \div 0.35$ or 35.7...	M1	oe, or $35 \times 0.35 = 12.25$ and $36 \times 0.35 = 12.6$
	35	A1	

Question 24 A2 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
24(a)	$(-2.6)^2 + 3 \times -2.6$ or $6.76 - 7.8$	M1	oe
	-1.04	A1	
24(b)	She has squared 2.6 and then made it negative (she needed brackets round -2.6)	B1	oe, such as $(-2.6)^2$ is 6.76, not -6.76

Question 25 A2 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
25	24.62 for one of the expressions	M1	from $2 \times 11.56 + 1.5$ or $27.2 - 2.58$
	24.62 for both	A1	

Question 26 A1 A2 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
26	three of 0.36, 0.6, 0.77..., 1.66... seen	M1	values of $n^2, n, \sqrt{n}, \frac{1}{n}$
	$n^2, n, \sqrt{n}, \frac{1}{n}$	A1	

Question 27 A2 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
27	1.85^3 or 6.33... or 12.66...	M1	
	12.7	A1	accept 12.7 or [12.66, 12.67]

Question 28 A21 A2 · Common · Grade 3 · 3 marks

Q	Answer	Mark	Comments
28(a)	$18.5 + 0.048t$	B1	oe, such as $18.50 + 0.048t$ or $\frac{1850 + 4.8t}{100}$
28(b)	$18.5 + 0.048 \times 137$ or $18.5 + 6.576$ or 25.076	M1	oe, or $1850 + 4.8 \times 137$ or 2507.6 in pence
	£25.08	A1	

Question 29 A4 A17 · Foundation · Grade 3 · 4 marks

Q	Answer	Mark	Comments
29(a)	$2.4(3x + 1.75)$ or $2.4 \times 3x$ or 2.4×1.75	M1	oe, one term correct
	$7.2x + 4.2$	A1	with $2.4(3x + 1.75)$ or both products seen
29(b)	$7.2x + 4.2 = 25.8$ or $25.8 - 4.2$ or 21.6	M1	oe, or $25.8 \div 2.4 = 10.75$
	3	A1	

Question 30 A2 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
30(a)	24.38 seen	M1	from $3 \times 6.76 + 4.1$, or 24.38 and 1.4 both seen
	17.41428571	A1	accept 17.414 or better
30(b)	17.4	B1ft	ft their (a) if it has more than 1 decimal place