Year 9 Algebraic Expressions – Mixed Practice

ANSWER KEY HappyKids.fit

Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. $2a^2 - 4a + 2$

Multiply every term by every term

$2a^2 - 2a - 2a + 2$

Collect the a terms: $2a^2 - 4a + 2$

2. $-2a^2$

Divide first: $30a^3 \div 5a = 6a^2$

Then subtract: $6a^2 - 8a^2 = -2a^2$

3. $m^2 - 11m + 24$

Multiply every term by every term

$m^2 - 8m - 3m + 24$

Collect the m terms: $m^2 - 11m + 24$

4. 13

Brackets (and the root) first: $12^2 + 5^2 = 144 + 25 = 169$

$\sqrt{169} = 13$

5. $(n + 5)^2$

Start with n and follow the steps in order

$(n + 5)^2$

6. $6m^2$

Divide the numbers: $36 \div 6 = 6$

Subtract the indices: $6 - 4 = 2$

7. 5

Factorise the numerator: $5(n - 9)$

The bracket cancels with the denominator: 5

8. $-3x^2 + 48$

Expand the bracket: $6x^2 + 48$

Collect the x^2 terms: $-3x^2 + 48$

9. Mistake: the square of a bracket is not the square of each term. Correct: $x^2 + 10x + 25$

Error: the square of a bracket is not the square of each term

$(x + 5)^2 = (x + 5)(x + 5)$

$= x^2 + 10x + 25$

10. Expand both parts and subtract: the result is x^2.

$(x + 4)(x - 4) = x^2 - 4x + 4x - 16$

$= x^2 - 16$

Add 16: x^2

11. $2n^2 + 6n - 36$

Multiply every term by every term
$2n^2 - 6n + 12n - 36$
Collect the n terms: $2n^2 + 6n - 36$

12. 33

Substitute $x = -3$, keeping the negative number in brackets
Indices before × and ÷, then + and −
= 33

13. Yes. $(2x)^3 = 2x \times 2x \times 2x = 2^3 \times x^3 = 8x^3$.

Test some values, or expand and simplify
$(2x)^3 = 2x \times 2x \times 2x = 2^3 \times x^3 = 8x^3$.
Decide

14. $y/5$

Factorise both: $y(y + 7)$ and $5(y + 7)$
Cancel $(y + 7)$: $y/5$

15. $\sqrt{n} + 3$

Start with n and follow the steps in order
$\sqrt{n} + 3$

16. $x^2 + 17x + 72$ m^2

The bigger rectangle is $(x + 8)$ m by $(x + 1 + 8)$ m
Area = $(x + 8)(x + 9)$
= $x^2 + 17x + 72$ m^2

17. $15m^8$

Multiply the numbers: $5 \times 3 = 15$
Add the indices: $3 + 5 = 8$

18. $n^3/4$

Divide the numbers by their HCF 3: $3/12 = 1/4$
Subtract the indices: $n^6 \div n^3 = n^3$

19. Mistake: -3×-7 is +21, not −21. Correct: $5x + 21$

Error: -3×-7 is +21, not −21
$8x - 3x + 21$
$= 5x + 21$

20. $25m^6n^6$

Numbers: $5 \times 5 = 25$
Add the indices of each letter: m^6 and n^6

21. $4x^2 - 20x + 25$ cm^2

Area = $(2x - 5)^2$
= $(2x - 5)(2x - 5)$
= $4x^2 - 20x + 25$ cm^2

22. 25

Substitute $x = -2$, keeping the negative number in brackets
Indices before × and ÷, then + and −
$= 25$

23. Expand both parts and subtract: the result is 12x.

$(x + 3)^2 = x^2 + 6x + 9$
$(x - 3)^2 = x^2 - 6x + 9$
Subtract: $6x - (-6x) = 12x$

24. $10t^2 + 14t + 4$

Multiply every term by every term
$10t^2 + 4t + 10t + 4$
Collect the t terms: $10t^2 + 14t + 4$

25. 3/10

Factorise both: $3(y + 2)$ and $10(y + 2)$
Cancel $(y + 2)$: 3/10

26. $n^2/8$

Start with n and follow the steps in order
$n^2/8$

27. −1, −1, −1: the answer is always −1. $n \times (n + 2) - (n + 1)^2 = -1$.

$3 \times 5 - 4^2 = -1$, $5 \times 7 - 6^2 = -1$, $9 \times 11 - 10^2 = -1$
Expand and simplify $n \times (n + 2) - (n + 1)^2$
$= -1$

28. No. Counter-example: $x = 1/2$ gives $x^2 = 1/4$, which is smaller than 1/2 (and $x = 1$ gives equal values).

Test some values, or expand and simplify
Counter-example: $x = 1/2$ gives $x^2 = 1/4$, which is smaller than 1/2 (and $x = 1$ gives equal values).
Decide

29. 5n + 7

Factorise the numerator: $5(5n + 7)$
Cancel the common factor 5: $5n + 7$

30. $21y^2$

Multiply first: $5y \times 3y = 15y^2$
Then add: $6y^2 + 15y^2 = 21y^2$