

Recognising equivalent algebraic expressions



Recognise when expressions are equivalent and justify your decision.

Name _____

Date _____

How to work

Two expressions are equivalent if they always have the same value. You can check by collecting like terms, expanding brackets, or substituting a number.

A. Direct recognition

Which expression is equivalent?

Example $a+a+a \equiv 4a$ (but $a+4$ is not)

1. Which is equivalent to $5b$: $b+b+b+b+b$, $5+b$, or b^5 ?

Answer: _____

2. Is $3x$ equivalent to $x \times 3$? State yes or no.

Answer: _____

3. Is $2m+2m$ equivalent to $4m$? State yes or no.

Answer: _____

4. Choose the odd one out: $6c$, $c \times 6$, $c+c+c+c+c$, $c+6$.

Answer: _____

B. Collect like terms

Combine matching terms by adding coefficients.

Example $3a + 2a = 5a$ (add the coefficients)

5. Simplify $3a+2a$, then name an equivalent expression.

Answer: _____

6. Simplify $8x-3x$, then name an equivalent expression.

Answer: _____

7. Simplify $4m+m+2m$, then name an equivalent expression.

Answer: _____

C. Spot common mistakes

Why are $5m+m$ and $5m^2$ not equivalent?

Example $5m+m = 6m$ (not $5m^2$)

8. Is $p+p+p+2$ equivalent to $4p$? Explain.

Answer: _____

9. Is $4a+4$ equivalent to $8a$? Explain why or why not.

Answer: _____

10. Correct this: $5m+m \equiv 5m^2$.

Answer: _____

Recognising equivalent algebraic expressions

Apply collection and expansion to verify equivalence.



Name _____

Continue from page 1

Multi-variable and expansion

When variables are different, keep them separate. Use the distributive property to expand brackets.

D. Two variables and constants

Collect only the matching terms.

11. Match $a+a+b+b+b$ to one of: $2a+3b$, $5ab$, $3a+2b$.

Answer: _____

12. Match $4r-r+2$ to one of: $3r+2$, $5r+2$, $3r$.

Answer: _____

13. Are $2x+3x$ and $4x+x$ equivalent? Briefly explain.

Answer: _____

E. Expand single brackets

Multiply all terms inside the bracket.

Example $2(a+3) = 2a + 6$ (multiply both a and 3 by 2)

14. Expand $2(a+3)$; which is equivalent?

Answer: _____

15. Expand $3(x+2)$; which is equivalent?

Answer: _____

16. Expand $4(m-1)$; which is equivalent?

Answer: _____

F. Common expansion errors

Remember to multiply every term in the bracket.

Example $2(x+5)=2x+10$ (not $2x+5$)

17. Complete: $5(p+2) \equiv 5p + \square$.

Answer: _____

18. Is $2(x+5)$ equivalent to $2x+5$? Explain the difference.

Answer: _____

G. Use substitution to verify

19. For $x=3$, compare $4x$ and $x+x+x+x$. What do you notice?

Answer: _____

20. For $a=2$, compare $3(a+1)$ and $3a+3$. What do you notice?

Answer: _____