Expanding single brackets

Mana Maths

Te reo Māori terms

taiapa
bracket
Open in Te Aka

mōiri
expand
Open in Te Aka

tau whakarea
multiplication
Open in Te Aka

kīanga
expression
Open in Te Aka

Notes & Steps

Key idea

Expanding a bracket means multiplying each term inside the bracket by the term outside. This uses the distributive property: $a(b+c) = ab + ac$. The number (or variable) outside multiplies **every** term inside, one at a time.

Steps

1. Identify the term outside the bracket (the multiplier).
2. Multiply it by the first term inside the bracket.
3. Multiply it by the next term inside the bracket.
4. Write as a sum: $\text{term}_1 + \text{term}_2$.
5. Watch the signs! A negative outside flips the signs inside: $-3(x-2) = -3x + 6$.

Examples

- $4(x+3) = 4x + 12$
- $-2(y+5) = -2y - 10$
- $3(2x-1) = 6x - 3$
- $-5(4a-2) = -20a + 10$
- $x(x+4) = x^2 + 4x$
- $2a(3a-1) = 6a^2 - 2a$

Common mistake

Only multiplying the first term inside the bracket. The multiplier goes to **every** term. $4(x+3) = 4x + 12$, not $4x + 3$. Check by substituting $x = 1$: $4(1+3) = 16$ vs $4(1) + 3 = 7$ — only the first answer is right.

Notes & Steps

Example 1: positive multiplier

Expand $5(2x + 3)$.

$$5 \times 2x = 10x, \quad 5 \times 3 = 15$$

Answer: $10x + 15$

Example 2: negative multiplier

Expand $-4(3a - 2)$.

$$-4 \times 3a = -12a, \quad -4 \times (-2) = 8$$

Answer: $-12a + 8$

Example 3: expand and simplify

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

$$3 \times 2x = 6x, \quad 3 \times 4 = 12$$

So $6x + 12 - 5 = 6x + 7$

Example 4: double expansion

Simplify $2(3x + 1) + 4(2x - 3)$.

$$6x + 2 + 8x - 12 = 14x - 10$$

Try these

1. Expand $3(x + 7)$.
2. Expand $-2(4a - 3)$.
3. Expand and simplify $4(2x + 5) - 3$.

Common mistake

Forgetting to multiply the sign too. $-3(x - 4)$ gives $-3x + 12$, because $-3 \times (-4) = +12$. Some students write $-3x - 12$ — that's wrong.

Start Tasks

1. Expand $2(x + 3)$

2. Expand $3(a + 4)$

3. Expand $4(y + 2)$

4. Expand $5(m + 1)$

5. Expand $6(p + 2)$

6. Expand $2(b + 7)$

7. Expand $3(c + 5)$

8. Expand $7(d + 1)$

9. Expand $4(2x + 1)$

Start Tasks — Answers

1. $2x + 6$

2. $3a + 12$

3. $4y + 8$

4. $5m + 5$

5. $6p + 12$

6. $2b + 14$

7. $3c + 15$

8. $7d + 7$

9. $8x + 4$

Start Tasks

10. Expand $3(2y + 4)$

11. Expand $5(a + 6)$

12. Expand $2(3m + 2)$

13. Expand $4(n + 5)$

14. Expand $3(4p + 1)$

15. Expand $2(q + 9)$

16. Expand $5(r + 3)$

17. Expand $6(s + 2)$

18. Expand $3(5t + 1)$

Start Tasks — Answers

10. $6y + 12$

11. $5a + 30$

12. $6m + 4$

13. $4n + 20$

14. $12p + 3$

15. $2q + 18$

16. $5r + 15$

17. $6s + 12$

18. $15t + 3$

Start Tasks

19. Expand $4(3u + 2)$

20. Expand $7(v + 4)$

21. Expand $2(6w + 3)$

22. Expand $5(2x + 7)$

23. Expand $3(4y + 5)$

24. Expand $6(3z + 1)$

25. Expand $8(a + 2)$

26. Expand $4(5b + 3)$

27. Expand $2(7c + 6)$

Start Tasks — Answers

19. $12u + 8$

20. $7v + 28$

21. $12w + 6$

22. $10x + 35$

23. $12y + 20$

24. $18z + 3$

25. $8a + 16$

26. $20b + 12$

27. $14c + 12$

Build Tasks

1. Expand $3(x + 5)$

2. Expand $4(2a + 3)$

3. Expand $5(y + 7)$

4. Expand $2(4m + 5)$

5. Expand $6(p + 2)$

6. Expand $3(3b + 4)$

7. Expand $7(c - 2)$

8. Expand $4(2d - 5)$

9. Expand $5(x - 6)$

Build Tasks — Answers

1. $3x + 15$

2. $8a + 12$

3. $5y + 35$

4. $8m + 10$

5. $6p + 12$

6. $9b + 12$

7. $7c - 14$

8. $8d - 20$

9. $5x - 30$

Build Tasks

10. Expand $2(5y - 3)$

11. Expand $-3(a + 4)$

12. Expand $-2(m - 5)$

13. Expand $-4(2n + 3)$

14. Expand $-5(p - 2)$

15. Expand $-3(4q + 1)$

16. Fill blank:
$4(x + 3) = 4x + \square$

17. Fill blank:
$-2(y + 6) = -2y\square$

18. Fill blank:
$5(2a - 3) = 10a - \square$

Build Tasks — Answers

10. $10y - 6$

11. $-3a - 12$

12. $-2m + 10$

13. $-8n - 12$

14. $-5p + 10$

15. $-12q - 3$

16. 12

17. -12

18. 15

Build Tasks

19. Fill blank:
$-3(b + 4) = \square - 12$

20. Fill blank:
$2(3c - 5) = 6c - \square$

21. True or false:
$3(a + 2) = 3a + 2$?

22. True or false:
$5(x - 1) = 5x - 5$?

23. True or false:
$-2(y + 3) = -2y + 6$?

24. True or false:
$4(2m - 1) = 8m - 4$?

25. True or false:
$-3(n + 4) = -3n - 12$?

26. Which greater:
$4(x + 2)$ or $4x + 2$?
Explain.

27. What happens to every term inside the bracket?

Build Tasks — Answers

19. $-3b$

20. 10

21. **False**

22. **True**

23. **False**

24. **True**

25. **False**

26. $4x + 2$

27. **Multiply every term inside by the outside term**

Push Tasks

1. Expand $3(2x + 5)$

2. Expand $4(3a - 2)$

3. Expand $-2(y + 7)$

4. Expand $-5(2m - 3)$

5. Expand $6(p - q)$

6. Expand $-3(4b + c)$

7. Expand and simplify $2(3x - 4) + 5$

8. Expand and simplify $7 - (2y + 3)$

9. Expand and simplify $4(2a + 1) - 3$

Push Tasks — Answers

1. $3(2x + 5)$ Expand

$3 \times 2x + 3 \times 5 = 6x + 15$

2. $4(3a - 2)$ Expand

$4 \times 3a - 4 \times 2 = 12a - 8$

3. $-2(y + 7)$ Expand

$-2y - 14$

4. $-5(2m - 3)$ Expand

$-10m + 15$

5. $6(p - q)$ Expand

$6p - 6q$

6. $-3(4b + c)$ Expand

$-12b - 3c$

7. $2(3x - 4) + 5$

$6x - 8 + 5 = 6x - 3$

8. $7 - (2y + 3)$

$7 - 2y - 3 = -2y + 4$

9. $4(2a + 1) - 3$

$8a + 4 - 3 = 8a + 1$

Push Tasks

10. Expand and simplify $3(5b - 2) + 8$

11. Expand and simplify $2(4c + 3) - 3(2c - 1)$

12. Expand and simplify $-5(2d - 1) + 4(3d + 2)$

13. Find missing: $\square(x + 4) = 6x + 24$

14. Find missing: $-4(y - \square) = -4y + 20$

15. Find missing: $5(\square + 2) = 15x + 10$

16. Find missing: $\square(2a - 3) = 8a - 12$

17. Find missing: $-3(b + \square) = -3b - 15$

18. Find missing: $4(\square - 5) = 12x - 20$

Push Tasks — Answers

10. $3(5b - 2) + 8$

$15b - 6 + 8 = 15b + 2$

13. $\square(x + 4) = 6x + 24$

$\square = 6$

16. $\square(2a - 3) = 8a - 12$

$\square = 4$

11. $2(4c + 3) - 3(2c - 1)$

$8c + 6 - 6c + 3 = 2c + 9$

14.

$-4(y - \square) = -4y + 20$

$\square = 5$

17.

$-3(b + \square) = -3b - 15$

$\square = 5$

12.

$-5(2d - 1) + 4(3d + 2)$

$-10d + 5 + 12d + 8 =$

$2d + 13$

15. $5(\square + 2) = 15x + 10$

$\square = 3x$

18. $4(\square - 5) = 12x - 20$

$\square = 3x$

Push Tasks

19. Which is greater: $3(2x + 1)$ or $6x + 3$?

20. Which does not belong: $2(x + 3)$, $2x + 3$, $2x + 6$, $3(x + 2)$? Why?

21. Write an expression that expands to $5x + 15$.

22. Write an expression that expands to $-2a + 8$.

23. Write an expression that expands to $12x - 8$.

24. Write an expression that expands to $-9a - 6$.

25. A rectangle: sides x and $x + 3$. Write perimeter as expanded expression.

26. A rectangle: length $2x + 1$, width 3. Write area as expanded expression.

27. Explain why $k(3 + 2) = 5k$. Which property?

Push Tasks — Answers

19. $3(2x+1)$ vs $6x+3$
Equal (same — distributive property)

20. $2(x+3), 2x+3, 2x+6, 3(x+2)$
$2x+3$ **doesn't belong (others** $= 2x+6$**)**

21. Write expanding to $5x+15$
$5(x+3)$

22. Write expanding to $-2a+8$
$-2(a-4)$

23. Write expanding to $12x-8$
$4(3x-2)$

24. Write expanding to $-9a-6$
$-3(3a+2)$

25. Rect: x by $x+3$, perimeter
$4x+6$

26. Rect: $2x+1$ by 3, area
$6x+3$

27. $k(3+2)=5k$, property?
Distributive property