LESSON MAKER PRO

Expression Detectives

Decide when two expressions give the same result.

GRADE 6 · 6.AF.A.17

6.AF.A.17 "Determine whether two expressions are equivalent and justify the reasoning."

NAME _____ DATE _____

THE BIG IDEA

Equivalent expressions have the same value for every value of x. To check a pair, use the distributive property or combine like terms. Then compare the expressions you get.

WORKED EXAMPLE

Are 9(x + 7) and 9x + 63 equivalent?

1. Distribute 9: 9(x + 7) = 9x + 9 × 7.
2. Multiply: 9x + 9 × 7 = 9x + 63.
3. Both expressions are now the same.

Answer: Yes, they are equivalent.

PRACTICE 6 problems

1 Are 3(x + 4) and 3x + 12 equivalent? Show why.

ANSWER _____

2 Are 5(x + 2) and 5x + 2 equivalent? Show why.

ANSWER _____

3 Are 4x + 6x and 10x equivalent? Show why.

ANSWER _____

4 Are 8(x - 3) and 8x - 11 equivalent? Show why.

ANSWER _____

5 Are 2(x + 6) + 4 and 2x + 16 equivalent? Show why.

ANSWER _____

6 Are 6x - 2(x + 1) and 4x - 2 equivalent? Show why.

ANSWER _____

APPLY IT Show your work

1 At a school esports tournament, tickets cost $8 each. A group has x students and 2 teachers. Are 8(x + 2) and 8x + 16 equivalent expressions for the group's total ticket cost? Explain.

WORK SPACE

ANSWER _____

2 A team orders x wristbands for $6 each and pays a one-time $5 shipping fee. Casey writes 6(x + 5) for the total cost. Robin writes 6x + 5. Are their expressions equivalent? Which one shows the total cost? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Are 3(2x + 4) - 2(x - 5) and 4x + 22 equivalent? Explain by rewriting the first expression.

WORK SPACE AND ANSWER

ANSWER KEY

Expression Detectives

GRADE 6 · 6.AF.A.17

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Are 3(x + 4) and 3x + 12 equivalent? Show why.	**Yes. 3(x + 4) = 3x + 12.**
2	Are 5(x + 2) and 5x + 2 equivalent? Show why.	**No. 5(x + 2) = 5x + 10, not 5x + 2.**
3	Are 4x + 6x and 10x equivalent? Show why.	**Yes. 4x + 6x = 10x.**
4	Are 8(x - 3) and 8x - 11 equivalent? Show why.	**No. 8(x - 3) = 8x - 24, not 8x - 11.**
5	Are 2(x + 6) + 4 and 2x + 16 equivalent? Show why.	**Yes. 2(x + 6) + 4 = 2x + 12 + 4 = 2x + 16.**
6	Are 6x - 2(x + 1) and 4x - 2 equivalent? Show why.	**Yes. 6x - 2(x + 1) = 6x - 2x - 2 = 4x - 2.**

PART 2 · APPLY IT

1. **Yes. Both expressions show the total cost of tickets for x students and 2 teachers.** Distribute 8 to get 8(x + 2) = 8x + 16.
2. **No. Robin's expression, 6x + 5, shows the total cost.** Casey's expression equals 6x + 30, which adds $30 instead of the $5 shipping fee.

CHALLENGE

Yes. 3(2x + 4) - 2(x - 5) = 6x + 12 - 2x + 10 = 4x + 22.

Accept any correct rewrite that shows whether the expressions match for every value of x. Testing only one value of x does not prove equivalence.