

Grade 6 - Equivalent Expressions and the Distributive Property - Answer Key

Common Core 6.EE.A.3, 6.EE.A.4 · maths-pdf.fr/en/

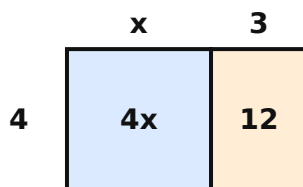
Check each simplified expression here. The solutions show the distributive step, the like terms combined, and a check with a number when it helps. Area models and tables support several answers.

Grade 6 · Common Core State Standards: **6.EE.A.3, 6.EE.A.4**

Exercise 1 - Distribute over a sum

$$4(x+3) = 4 \cdot x + 4 \cdot 3$$

$$4x + 12$$



The two parts have areas $4x$ and 12 .

Exercise 2 - Distribute with a coefficient

$$5 \cdot 2y = 10y \text{ and } 5 \cdot 7 = 35.$$

$$10y + 35$$

Exercise 3 - Distribute over a difference

$$3 \cdot a = 3a \text{ and } 3 \cdot 4 = 12, \text{ with a minus sign between.}$$

$$3a - 12$$

Exercise 4 - Distribute a variable sum

$$6 \cdot m + 6 \cdot n$$

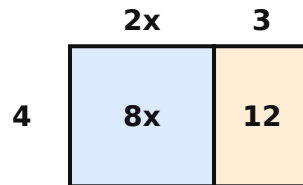
$$6m + 6n$$

Exercise 5 - Factor out the GCF

The GCF of 8 and 12 is 4.

$$8x = 4 \cdot 2x \text{ and } 12 = 4 \cdot 3.$$

$$4(2x+3)$$



Rectangle of height 4.

Exercise 6 - Factor a sum

The GCF of 15 and 20 is 5.

$$15+20y = 5 \cdot 3 + 5 \cdot 4y$$

$$5(3+4y)$$

Exercise 7 - Combine like terms

The terms have the same variable part, so add the coefficients: $5+3=8$.

$$8x$$

x	1	2	3
5x + 3x	8	16	24
8x	8	16	24

Both expressions give the same values.

Exercise 8 - Combine several terms

Like terms: $7a+3a=10a$ and $2+9=11$.

$$10a+11$$

Exercise 9 - Subtract like terms

$$9y - 4y = 5y.$$

$$5y + 6$$

Exercise 10 - Two variables

$$x\text{-terms: } 2x + 4x = 6x. \quad y\text{-terms: } 3y - y = 2y.$$

$$6x + 2y$$

Exercise 11 - Which are equivalent?

$$3(x+2) = 3x+6 \text{ by the distributive property.}$$

C is $3x+6$. D is $x+x+x+6=3x+6$. B is missing the 3 times 2.

C and D

Exercise 12 - Test with a number

$$2(4+5) = 2 \cdot 9 = 18.$$

$$2 \cdot 4 + 5 = 13.$$

The values differ, so the expressions are not equivalent.

Not equivalent

Expression	$x = 4$
$2(x + 5)$	18
$2x + 5$	13

Different values mean not equivalent.

Exercise 13 - Add versus multiply

$$5+5+5=15 \text{ and } 3 \cdot 5=15: \text{ equivalent.}$$

$5 \cdot 5 = 25$, which is not 15.

$y + y + y = 3y$; $y \cdot y = y^2$ is different.

Exercise 14 - Area of a rectangle

Whole rectangle: $5(x+2)$.

Two parts: $5x+10$.

$$5(x+2) = 5x+10$$

Exercise 15 - Distribute then combine

$$2(3x+4) = 6x+8.$$

$$6x+8+5x = 11x+8.$$

$$11x+8$$

Exercise 16 - Distribute a fraction

$$\frac{1}{2} \cdot 8x = 4x \text{ and } \frac{1}{2} \cdot 6 = 3.$$

$$4x+3$$

Exercise 17 - Tickets and fees

$$6t+2t \text{ or } (6+2)t.$$

$$6t+2t = 8t.$$

For 5 tickets: $8 \cdot 5 = 40$.

$8t$; **\$40.00**

Exercise 18 - Perimeter of a triangle

Add the sides: $(x+3)+(x+3)+(x+3)$.

Or multiply: $3(x+3) = 3x+9$.

$$3(x+3)=3x+9$$

Exercise 19 - Simplify with a difference

$$10x-3x=7x \text{ and } 2(x+4)=2x+8.$$

$$7x+2x+8=9x+8$$

$$9x+8$$

Exercise 20 - Multi-step expression

$$3(2x+5)=6x+15.$$

$$6x+15-4x+1=2x+16.$$

$$\text{Check: } 3(2 \cdot 2+5)-4 \cdot 2+1=27-8+1=20 \text{ and } 2 \cdot 2+16=20.$$

$$2x+16$$