

Grade 6 · Writing and Evaluating Algebraic Expressions · Worksheet Answer Key

Common Core 6.EE.A.2, 6.EE.A.3, 6.EE.A.4 · mathovore.fr

This answer key gives complete worked solutions for all 20 problems on the algebraic expressions worksheet. Each solution shows the substitution or the property that was used, and every final answer is in bold so students can check their own work quickly.

Grade 6 Common Core: 6.EE.A.2 · 6.EE.A.3 · 6.EE.A.4

Problem 1: Parts of an Expression

- a. The terms are $7x$, $4y$, and 9 : **3 terms**
- b. The coefficient of x is 7
- c. The coefficient of y is 4
- d. The term with no variable is 9

Problem 2: Writing Simple Expressions

- a. n plus 8: $n+8$
- b. y minus 6: $y-6$
- c. 5 times m : $5m$
- d. k over 4: $\frac{k}{4}$

Problem 3: Naming Operations

- a. $t+7$ adds 7 to t : **sum**
- b. $9w$ means 9 times w : **product**
- c. $\frac{y}{5}$ means y divided by 5: **quotient**
- d. $12-k$ subtracts k from 12: **difference**

Problem 4: Writing Longer Expressions

- a. Sum first, then double: $2(x+7)$
- b. $3a$, then subtract 2: $3a-2$
- c. 20 divided by p : $\frac{20}{p}$
- d. The product is $4t$; 9 less than it is $4t-9$

Problem 5: Evaluating Expressions

- a. $6+9=15$

- b. $4 \times 6 = 24$
- c. $30 \div 6 = 5$
- d. $3 \times 6 - 5 = 18 - 5 = 13$

Problem 6: Two Variables

- a. $4 + 5 = 9$
- b. $3(4) + 2(5) = 12 + 10 = 22$
- c. $4 \times 5 - 6 = 20 - 6 = 14$
- d. $2(4 + 5) = 2 \times 9 = 18$

Problem 7: Exponents First

- a. $2(3)^2 + 1 = 2(9) + 1 = 18 + 1 = 19$
- b. $(3 + 5)^2 = 8^2 = 64$
- c. $4(3)^2 - 3(3) = 36 - 9 = 27$
- d. $60 - 2(3)^3 = 60 - 2(27) = 60 - 54 = 6$

Problem 8: Exponents and Formulas

- a. $7^2 = 49$
- b. $5 \times 4^2 - 10 = 5 \times 16 - 10 = 80 - 10 = 70$
- c. $V = 5^3 = 125$. Answer: 125 ft³
- d. $A = 6 \times \left(\frac{1}{2}\right)^2 = 6 \times \frac{1}{4} = \frac{6}{4} = \frac{3}{2} \text{ in}^2$, or 1.5 square inches

Problem 9: Tape Diagram Expression

- a. Three pieces of length x give $3x$. Adding the 5-inch piece gives $3x + 5$.
- b. $3(7) + 5 = 21 + 5 = 26 \text{ in}$
- c. $3(2.5) + 5 = 7.5 + 5 = 12.5 \text{ in}$

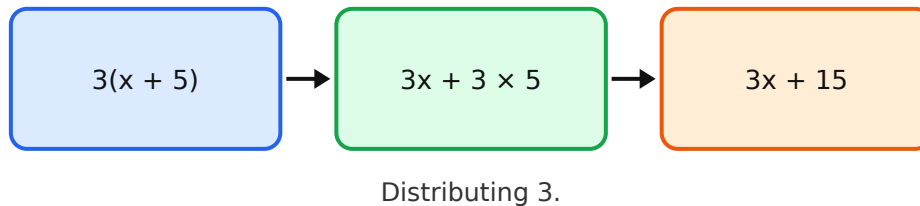


total = 26

The same ribbon when $x = 7$.

Problem 10: Distributive Property

- a. $3 \times x + 3 \times 5 = 3x + 15$
- b. $4 \times 2y + 4 \times 1 = 8y + 4$
- c. The greatest common factor of 6 and 9 is 3: $3(2x + 3)$
- d. The greatest common factor of 10 and 15 is 5: $5(2 + 3m)$



Problem 11: Area Model for Expanding

- The total width is $x+4$, so the area is $6(x+4)$.
- The left rectangle has area $6 \times x = 6x$. The right rectangle has area $6 \times 4 = 24$. The total is $6x+24$.
- $8y = 4 \times 2y$ and $20 = 4 \times 5$, so $8y+20 = 4(2y+5)$.
- $9(k+3) = 9 \times k + 9 \times 3 = 9k+27$



Area $6(x + 4) = 6x + 24$.

Problem 12: Combining Like Terms

- $7+3=10$: $10a$
- $9-4=5$: $5b$
- $2x+6x=8x$ and $5+1=6$: $8x+6$
- $3y+y+2y=6y$, so the result is $6y+4$

Problem 13: Like Terms with Two Variables

- x -terms: $5x+2x=7x$. y -terms: $3y+y=4y$. Answer: $7x+4y$
- a -terms: $8a-2a=6a$. Constants: $3+9=12$. Answer: $6a+12$
- m -terms: $9m-4m=5m$. n -terms: $6n-n=5n$. Answer: $5m+5n$
- Distribute first: $4(2p+3)=8p+12$. Then $8p+p=9p$. Answer: $9p+12$

Problem 14: Equivalent or Not

- $2(5+3)=16$ and $2(5)+6=16$. The distributive property gives $2(x+3)=2x+6$ for every x .
Equivalent
- $3(2)+4(2)=14$ but $7(2)^2=28$. The values differ, so **not equivalent**. ($3x+4x=7x$, not $7x^2$.)
- $5(4-1)=15$ but $5(4)-1=19$. The values differ, so **not equivalent**. (The 5 must multiply

both terms: $5y-5$.)

16 and 16
equivalent

14 and 28
not equivalent

15 and 19
not equivalent

Results of the three checks.

Problem 15: Dog Walking Pay

Pay for h hours is $12h$, plus the \$5 tip: $12h+5$.

When $h=6$: $12 \times 6 + 5 = 72 + 5 = 77$.

Total pay: $12h+5$; **\$77**

Problem 16: Cupcake Profit

- a. Income is $1.5c$ dollars and the cost is \$12, so the profit is $1.5c-12$.
- b. $1.5(40)-12=60-12=\$48$
- c. $1.5(8)-12=12-12=\$0$. Eight cupcakes only pay back the ingredients, so Priya breaks even.

Problem 17: Pizza Shop Prices

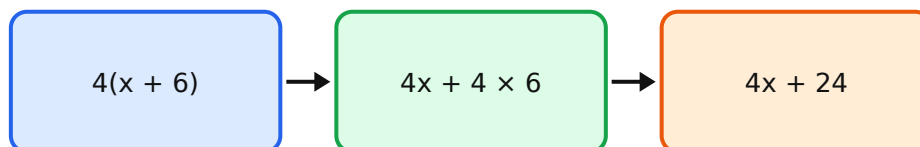
- a. Shop A: $8p+15$. Shop B: $10p+5$.
- b. $p=4$: A is $8(4)+15=47$ and B is $10(4)+5=45$.
 $p=5$: A is $8(5)+15=55$ and B is $10(5)+5=55$.
 $p=6$: A is $8(6)+15=63$ and B is $10(6)+5=65$.
- c. For 6 pizzas Shop A costs \$63 and Shop B costs \$65. Shop A is cheaper by $65-63=\$2$.

Problem 18: Flower Bed Area

Area is width times length: $4(x+6)$. By the distributive property, $4(x+6)=4x+24$.

Check with $x=3$: $4(3+6)=4 \times 9=36$, and $4(3)+24=12+24=36$. Both give 36.

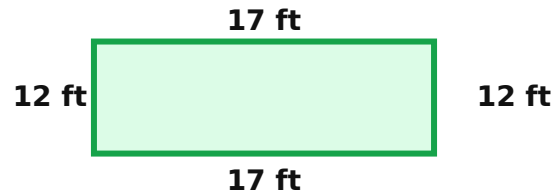
Equivalent expressions: $4(x+6)$ **and** $4x+24$



Two equivalent area expressions.

Problem 19: Dog Run Fencing

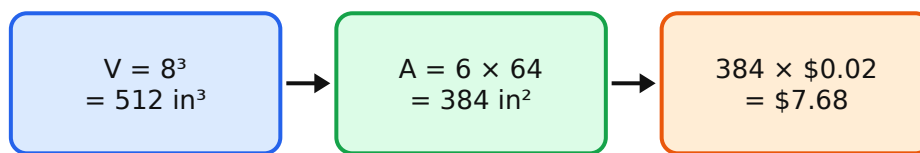
- a. Add the four sides: $w + (w+5) + w + (w+5) = 4w + 10$. Doubling the sum of width and length gives the equivalent $2w + 2(w+5)$.
- b. $4(12) + 10 = 48 + 10 = 58$ ft. Check: $2(12) + 2(17) = 24 + 34 = 58$.
- c. $58 \times 3.25 = 188.5$, so the fence costs \$188.50.



Perimeter: $12 + 17 + 12 + 17 = 58$ ft.

Problem 20: Gift Box

- a. $V = 8^3 = 8 \times 8 \times 8 = 512$. Answer: 512 in^3
- b. $A = 6 \times 8^2 = 6 \times 64 = 384$. Answer: 384 in^2
- c. Cost = $384 \times \$0.02 = \$7.68$. Answer: \$7.68



Gift box results.