

Writing, Evaluating and Simplifying Algebraic Expressions

Grade 6 math · Worksheet Answer Key · Standards: 6.EE.A.2, 6.EE.A.3, 6.EE.A.4

Every answer key entry writes the substitution before computing, so the order of operations is visible. Where expressions are simplified, check your result by testing one number in both the original and the simplified form.

Standards: 6.EE.A.2, 6.EE.A.3, 6.EE.A.4 · **Level:** Grade 6

Problem 1 Parts of an expression

The terms are $6n$ and 9. **Coefficient:** 6. **Constant:** 9. **Variable:** n .

Problem 2 Words to expressions

- a. $y + 9$
- b. $k - 4$
- c. $8w$
- d. $\frac{t}{5}$

Problem 3 Evaluate $4x + 3$

$$4 \times 6 + 3 = 24 + 3 = 27.$$

Problem 4 Evaluate $20 - 2n$

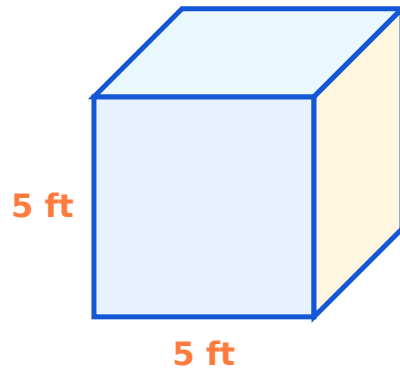
$$2 \times 7 = 14, \text{ and } 20 - 14 = 6.$$

Problem 5 Evaluate with a fraction

$$15 \div 3 = 5, \text{ and } 5 + 8 = 13.$$

Problem 6 Storage bin

$$V = 5 \times 5 \times 5 = 125. A = 6 \times 5^2 = 6 \times 25 = 150.$$



$V = 125$ cubic feet; $A = 150$ square feet.

125 cubic feet and 150 square feet.

Problem 7 Two variables

$$6 \times 3 + 4 \times 8 = 18 + 32 = \mathbf{50}.$$

Problem 8 Evaluate with a power

$$8^2 = 64 \text{ and } 3 \times 8 = 24, \text{ so } 64 - 24 = \mathbf{40}.$$

Problem 9 Harder phrases

- a. The product is $3n$; 5 less gives $\mathbf{3n - 5}$.
- b. The sum is $m + 7$; twice it is $\mathbf{2(m + 7)}$.

Problem 10 Equivalent or not

By the distributive property, $3(x + 2) = 3x + 6$. Expression (c) is the same terms in a different order. Check (a) at $x = 1$: $3(3) = 9$ but $3 + 2 = 5$, no. Check (d): $1 + 6 = 7$, no. **(b) and (c)**.

Problem 11 Expanding

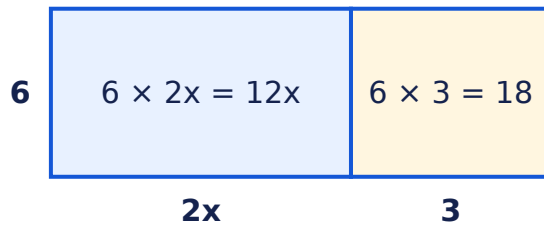
$$7(n + 4) = 7n + 28. 5(2y - 3) = 10y - 15. \mathbf{7n + 28 \text{ and } 10y - 15}.$$

Problem 12 Combining like terms

(a) $6 + 4 = 10$. (b) $9 - 5 = 4$. (c) Like terms: $3a + 2a = 5a$ and $7 + 5 = 12$. **(a) $10x$ (b) $4y$ (c) $5a + 12$.**

Problem 13 Factoring with the GCF

$$\text{GCF}(12, 18) = 6, \text{ so } 12x = 6 \times 2x \text{ and } 18 = 6 \times 3.$$



$$12x + 18 = 6(2x + 3).$$

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Problem 14 Perimeter of a rectangle

$$2(7.5 + 4.5) = 2 \times 12 = \mathbf{24 \text{ m.}}$$

Problem 15 Concert tickets

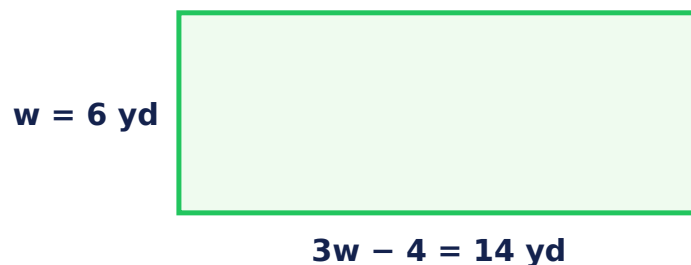
$$\text{Cost} = 14t + 3. \text{ For } t = 6: 14 \times 6 + 3 = 84 + 3 = \mathbf{\$87.}$$

Problem 16 Taxi ride

$$\text{Cost} = 4 + 2.5m. \text{ For } m = 8: 4 + 2.5 \times 8 = 4 + 20 = \mathbf{\$24.}$$

Problem 17 Vegetable bed

Length = $3w - 4$. Perimeter = $2(w + 3w - 4) = 2(4w - 4) = 8w - 8$. For $w = 6$: length 14 and perimeter $8 \times 6 - 8 = 40$.



For $w = 6$: length 14 yd, width 6 yd.

Length $3w - 4$; perimeter $8w - 8$; for $w = 6$ the perimeter is 40 yards.

Problem 18 Sticker packs

Ava: $5s + 8$. Ben: $3s + 12$. Together: $5s + 8 + 3s + 12 = 8s + 20$. For $s = 10$: $80 + 20 = \mathbf{8s + 20}$, which is **100 stickers**.

Problem 19 Equivalent test

For $x = 2$: $4(5) = 20$, but $4 \times 2 + 3 = 11$. Different values, so they are not equivalent. The 4 must multiply both terms. **Not equivalent; $4(x + 3) = 4x + 12$.**

Problem 20 Tiny gift box

$V = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$. $A = 6 \times \frac{1}{4} = \frac{6}{4} = \frac{3}{2}$. **$V = \frac{1}{8}$ cubic foot and $A = 1\frac{1}{2}$ square feet.**