

Grade 7 · Equivalent Expressions · Worksheet

Common Core 7.EE.A.1, 7.EE.A.2 · mathovore.fr

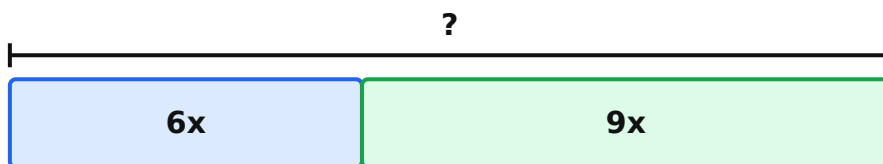
Name: _____ Date: ____/____/____ Score: _____

These 20 problems practice Common Core standards 7.EE.A.1 and 7.EE.A.2. You will combine like terms, expand and factor with the distributive property, subtract expressions, and work with fractions and decimals as coefficients. The last six are word problems that ask you to rewrite an expression, such as a price with a discount and sales tax, so its meaning is easier to see. Work from easiest to hardest.

Grade 7 Common Core: 7.EE.A.1 · 7.EE.A.2

Problem 1: Combine like terms

Simplify $6x + 9x$.



Two like terms joined end to end.

Problem 2: Algebra tiles

The tiles show the expression $3x + 2 + 4x + 5$. Combine the like terms to write an equivalent expression with two terms.



Blue tiles are x and orange squares are 1.

Problem 3: Collect terms and constants

Simplify $7y + 4 + 2y - 9$.

Problem 4: Expand with the distributive property

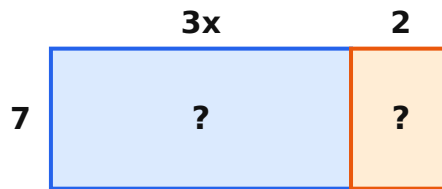
Expand $5(x + 6)$.



Find the two areas.

Problem 5: Area model for expanding

The rectangle has height 7 and a total width of $3x+2$. Use the two areas to expand $7(3x+2)$.



A rectangle with height 7 and widths $3x$ and 2.

Problem 6: Test equivalence with a table

Complete the table. Then decide which pairs of expressions appear to be equivalent, and explain how the expanded form proves it.

Expression	$x = 1$	$x = 2$	$x = 3$	$x = 4$
$2(x + 3)$				
$2x + 6$				
$2x + 3$				

Fill in each value.

Problem 7: Expand with a negative factor

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

Problem 8: Expand and combine

Expand each expression and simplify.

- $6(2y-3)$
- $-2(5-3a)$
- $4(x+2)+3(x-1)$

Problem 9: Factor out the greatest common factor

Factor $12x+18$ using the greatest common factor.



The two areas are $12x$ and 18 . Find the height and the widths.

Problem 10: Factor out a common factor

Factor each expression using the greatest common factor.

- a. $15a+25$
- b. $8x-12$
- c. $18m+54$
- d. $-6y-9$, with a negative common factor

Problem 11: Subtract an expression

Simplify $(3x+8)-(x-5)$.

Problem 12: Subtract and simplify

Simplify each expression.

- a. $(7x+3)-(2x+9)$
- b. $(2m-5)-(m-8)$
- c. $10-(3a+4)+a$

Problem 13: Rational coefficients

Simplify $\frac{2}{3}(9x-6)+x$.

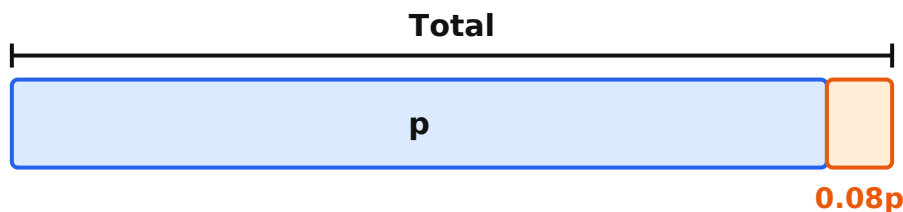
Problem 14: Decimal and fraction coefficients

Simplify each expression.

- a. $0.5(6x+10)+1.5x$
- b. $\frac{1}{3}(12x+9)-x$
- c. $\frac{3}{4}(8-4x)+x$

Problem 15: Sales tax at the school store

A hoodie at the school store costs p dollars, and the sales tax is 8% of the price. (a) Write the total cost as $p + 0.08p$, then rewrite it as one term. (b) Find the total for a \$25 hoodie. (c) Find the price of a hoodie whose total cost is \$54.



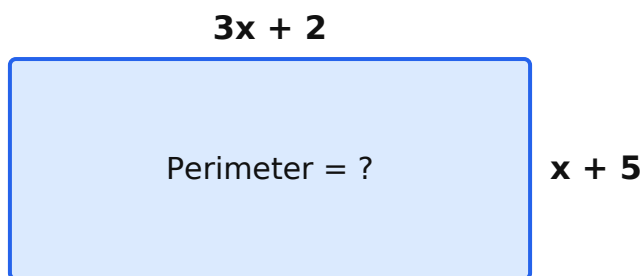
The price and the tax make up the total.

Problem 16: Discount, then tax

A pair of sneakers has a regular price of p dollars. The store takes 15% off, and then sales tax of 8% is added to the sale price. (a) Write the sale price as one term. (b) Write the final cost as one term. (c) Find the final cost when the regular price is \$60. (d) Find the regular price when the final cost is \$91.80.

Problem 17: Perimeter of a garden bed

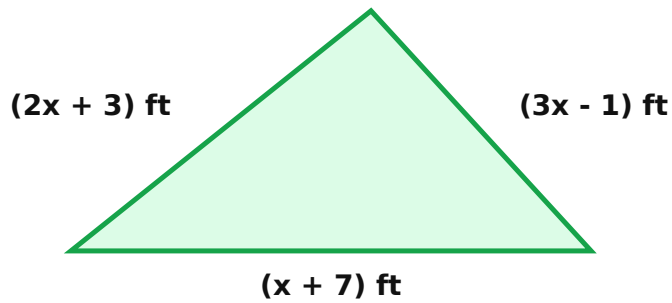
A rectangular garden bed has length $(3x+2)$ feet and width $(x+5)$ feet. (a) Write and simplify an expression for the perimeter. (b) Find the perimeter when $x=3$.



A rectangular garden bed.

Problem 18: Perimeter of a triangular bed

A triangular flower bed has sides of $(2x+3)$ ft, $(x+7)$ ft, and $(3x-1)$ ft, as shown. (a) Write and simplify an expression for the perimeter. (b) Find the perimeter when $x=4$ and describe the triangle. (c) Find x when the perimeter is 45 ft and give the three side lengths.



A triangular flower bed.

Problem 19: Three ways to write a gym bill

Three friends write the monthly cost of a gym that charges \$4 per class, with c classes. Ethan writes $12 + 4c$. Maya writes $4(c + 3)$. Noah writes $3(c + 4) + c$. (a) Expand Maya's and Noah's expressions. (b) Are all three expressions equivalent? (c) Find the cost for 9 classes and for 5 classes, using the simplest form.

Problem 20: Two ways to price a jersey

A Little League jersey costs p dollars. Maya has a 20% discount and then a \$5 coupon, so she pays $p - 0.20p - 5$. Ethan takes the coupon first, then the discount, so he pays $0.80(p - 5)$. (a) Rewrite Maya's expression as one with a single p term, and expand Ethan's. (b) Are the two expressions equivalent? (c) Find what each pays when $p = 40$.