

# Numerical and Algebraic Expressions: math practice, Grade 6 – download the PDF

21 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

## 1 Reading exponents



Write each power as a repeated multiplication, then find its value.

a.  $3^4$

b.  $2^6$

c.  $10^5$

d.  $7^2$

## 2 Order of operations



Find the value of each expression.

a.  $8 + 6 \cdot 3$

b.  $(8 + 6) \cdot 3$

c.  $30 - 12 \div 4$

d.  $5 \cdot 2^2$

### 3 Words to expressions



Write an algebraic expression for each phrase.

- a. 9 more than a number  $n$
- b. 4 times a number  $y$
- c. a number  $k$  decreased by 6
- d. the quotient of  $m$  and 5

### 4 Evaluate with one variable



Evaluate each expression when  $x = 6$ .

- a.  $x + 9$
- b.  $4x$
- c.  $30 - x$
- d.  $\frac{x}{3}$

### 5 Name the parts



Look at the expression  $7a + 3b + 12$ .

- a. How many terms does it have? List them.
- b. What is the coefficient of  $a$ ? Of  $b$ ?
- c. Which term is the constant?

### 6 Sort the like terms



Here are six terms:  $5x$ ,  $3y$ ,  $8$ ,  $2x$ ,  $9y$ ,  $4$ . Group them into sets of like terms and tell what makes each set “like.”

## 7 True or false?



Decide whether each statement is true or false, and justify your answer.

- a.  $2^3 = 6$
- b.  $4 + 3 \cdot 2 = 14$
- c.  $5(2 + 1) = 5 \cdot 2 + 5 \cdot 1$
- d.  $12 - 4 - 2 = 12 - (4 - 2)$

## 8 Several operations



Find the value of each expression. Show every step.

- a.  $3 + 2 \cdot (7 - 4)^2$
- b.  $48 \div 2^3 + 5 \cdot 4$
- c.  $(12 - 4)^2 \div 16$

## 9 Pizza party



Each pizza is cut into 8 slices. A party orders  $p$  pizzas.

- a. Write an expression for the total number of slices.
- b. How many slices are there if  $p = 3$ ,  $p = 5$ , and  $p = 12$ ?
- c. The party wants 72 slices. Test  $p = 8$  and  $p = 9$  to find how many pizzas to order.

## 10 Saving money



Mia already has 40 dollars and saves 15 dollars each week for  $w$  weeks.

- Write an expression for the amount she has after  $w$  weeks.
- How much does she have after 8 weeks? After 12 weeks?
- Name the coefficient and the constant in your expression.

## 11 Two variables



Evaluate each expression when  $a = 5$  and  $b = 3$ .

- $2a + 4b$
- $a^2 - b^2$
- $3(a + b)$

## 12 Expand with the distributive property



Use the distributive property to rewrite each expression without parentheses.

- $6(x + 4)$
- $3(2y + 5)$
- $7(n - 2)$

## 13 Combine like terms



Simplify each expression by combining like terms.

- $7x + 3x$
- $9y - 4y + 2$
- $5a + 2b + 3a + b$

**14 Equivalent or not?**

For each pair, test the value given, then decide whether the expressions are equivalent and explain.

- a.  $3(x + 2)$  and  $3x + 2$ , with  $x = 4$
- b.  $2x + x$  and  $3x$ , with  $x = 5$
- c.  $4(x + 1)$  and  $4x + 4$ , with  $x = 10$

**15 Factor out the common factor**

Use the greatest common factor to rewrite each sum as a product.

- a.  $12x + 18$
- b.  $20y + 30$
- c.  $35 + 14$

**16 Phone plan**

A phone plan costs 20 dollars per month plus 4 dollars for each extra gigabyte  $g$  of data.

- a. Write an expression for the monthly cost.
- b. Find the cost for  $g = 0$ ,  $g = 3$ , and  $g = 6$ .
- c. One month the bill is 48 dollars. How many extra gigabytes were used? Check your answer.

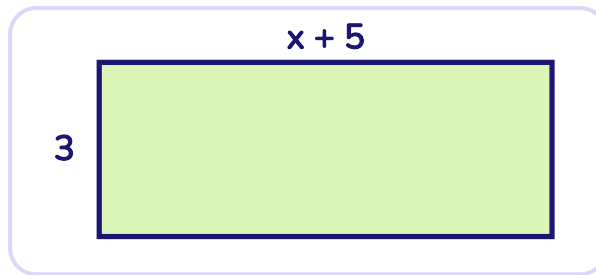
**17 Expand, then simplify**

Simplify  $5(x + 2) + 3x - 4$ , then check your result when  $x = 3$ .

### 18 Area and perimeter of a rectangle

★★★

A rectangle has width 3 and length  $x + 5$  (in feet).



- Write expressions for its area and its perimeter, and simplify them.
- Evaluate both when  $x = 4$ .

### 19 Find the errors

★★★

Leo made three mistakes. Find each one, then correct it.

- $4(x + 3) = 4x + 3$
- $2^4 = 8$
- $5 + 2x = 7x$

### 20 Prove an equivalence

★★★

Is  $2(3x + 4) - 2x$  equivalent to  $4x + 8$ ? First fill a value table for  $x = 1, 2, 3$ , then explain with properties.

### 21 Complex phrases

★★★

Write an expression for each phrase, then evaluate it for the value given.

- Three times the sum of a number  $n$  and 8, decreased by 5 ( $n = 4$ )
- The square of  $m$  plus twice  $m$  ( $m = 5$ )
- Half of the sum of  $a$  and 10 ( $a = 6$ )



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