

# Evaluating Expressions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Q Quick Review

To **evaluate** an expression, you **substitute** a given number for each variable and then simplify. For example, to evaluate  $3x + 5$  when  $x = 4$ , replace  $x$  with 4 to get  $3(4) + 5$ . Then follow the **order of operations**: multiply first,  $3 \times 4 = 12$ , then add,  $12 + 5 = 17$ . Always put the substituted number in parentheses so you don't lose track of an operation. Substitution turns a general expression into a single number answer.

◇ **Example:** Evaluate  $2a + 7$  when  $a = 6$ .

⇒ First, swap the variable for its value: wherever we see  $a$ , we put 6. That gives  $2(6) + 7$ . Now we follow the order of operations — multiplication comes before addition, so  $2 \times 6 = 12$ . The expression is now  $12 + 7$ , and adding gives 19. Substituting carefully and then working in order is the whole secret.

**Answer:** 19

## PRACTICE

Evaluate each expression for the given value of the variable.

- |                                     |       |                                    |       |
|-------------------------------------|-------|------------------------------------|-------|
| 1. $x + 8$ when $x = 5$             | _____ | 11. $8x - 5$ when $x = 1$          | _____ |
| 2. $y - 3$ when $y = 10$            | _____ | 12. $x^2$ when $x = 4$             | _____ |
| 3. $4n$ when $n = 6$                | _____ | 13. $2x^2$ when $x = 3$            | _____ |
| 4. $\frac{m}{2}$ when $m = 14$      | _____ | 14. $4(n + 2)$ when $n = 6$        | _____ |
| 5. $3x + 1$ when $x = 4$            | _____ | 15. $3a + 2b$ when $a = 5, b = 4$  | _____ |
| 6. $2y + 9$ when $y = 5$            | _____ | 16. $\frac{x+6}{2}$ when $x = 10$  | _____ |
| 7. $10 - 2k$ when $k = 3$           | _____ | 17. $x^2 + 5$ when $x = 6$         | _____ |
| 8. $5p - 4$ when $p = 2$            | _____ | 18. $7y - 2y$ when $y = 4$         | _____ |
| 9. $6 + 3n$ when $n = 7$            | _____ | 19. $2(a + b)$ when $a = 3, b = 7$ | _____ |
| 10. $\frac{a}{3} + 2$ when $a = 12$ | _____ | 20. $5x^2 - 3$ when $x = 2$        | _____ |

## ◆ Word Problems

21. The expression  $12n$  gives the total cost in dollars of  $n$  movie tickets. How much do 5 tickets cost? \_\_\_\_\_
22. A plumber charges  $50 + 35h$  dollars for a job that takes  $h$  hours. What is the cost of a 3-hour job? \_\_\_\_\_
23. The area of a rectangle is  $\ell w$ , where  $\ell$  is length and  $w$  is width. Find the area when  $\ell = 9$  cm and  $w = 4$  cm. \_\_\_\_\_
24. A square has side length  $s$ . Its area is  $s^2$ . Find the area of a square with side length 7 inches. \_\_\_\_\_



## Answer Keys

- |        |                      |
|--------|----------------------|
| 1. 13  | 13. 18               |
| 2. 7   | 14. 32               |
| 3. 24  | 15. 23               |
| 4. 7   | 16. 8                |
| 5. 13  | 17. 41               |
| 6. 19  | 18. 20               |
| 7. 4   | 19. 20               |
| 8. 6   | 20. 17               |
| 9. 27  | 21. \$60             |
| 10. 6  | 22. \$155            |
| 11. 3  | 23. 36 square cm     |
| 12. 16 | 24. 49 square inches |

### Step-by-Step Explanations

- |   |  |
|---|--|
| 1. Substitute 5 for $x$ : $5 + 8 = 13$ .              | 13. $x^2 = 9$ first, then $2 \times 9 = 18$ .  |
| 2. Replace $y$ with 10: $10 - 3 = 7$ .                | 14. Inside the parentheses: $6 + 2 = 8$ , then $4 \times 8 = 32$ .                     |
| 3. $4n$ means $4 \times n$ , so $4 \times 6 = 24$ .   | 15. $3(5) = 15$ and $2(4) = 8$ , so $15 + 8 = 23$ .                                    |
| 4. Substitute 14: $\frac{14}{2} = 7$ .                | 16. The fraction bar groups the top: $10 + 6 = 16$ , then $\frac{16}{2} = 8$ .         |
| 5. $3(4) = 12$ , then $12 + 1 = 13$ .                 | 17. $x^2 = 36$ , then $36 + 5 = 41$ .  |
| 6. $2(5) = 10$ , then $10 + 9 = 19$ .                 | 18. $7(4) = 28$ and $2(4) = 8$ , so $28 - 8 = 20$ .                                    |
| 7. $2(3) = 6$ , then $10 - 6 = 4$ .                   | 19. Inside the parentheses: $3 + 7 = 10$ , then $2 \times 10 = 20$ .                   |
| 8. $5(2) = 10$ , then $10 - 4 = 6$ .                  | 20. $x^2 = 4$ , then $5 \times 4 = 20$ , and $20 - 3 = 17$ .                           |
| 9. $3(7) = 21$ , then $6 + 21 = 27$ .                 | 21. Substitute $n = 5$ into $12n$ : $12 \times 5 = 60$ , so 5 tickets cost 60 dollars. |
| 10. $\frac{12}{3} = 4$ , then $4 + 2 = 6$ .           | 22. Substitute $h = 3$ : $50 + 35(3) = 50 + 105 = 155$ dollars.                        |
| 11. $8(1) = 8$ , then $8 - 5 = 3$ .                   | 23. Substitute the values: $\ell w = 9 \times 4 = 36$ square centimeters.              |
| 12. $x^2$ means $x \times x$ , so $4 \times 4 = 16$ . | 24. Substitute $s = 7$ into $s^2$ : $7^2 = 7 \times 7 = 49$ square inches.             |



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