Evaluating Expressions

Name: _____ Date: _____ Score: _____ / 24

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

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Answer Keys

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

Step-by-Step Explanations

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

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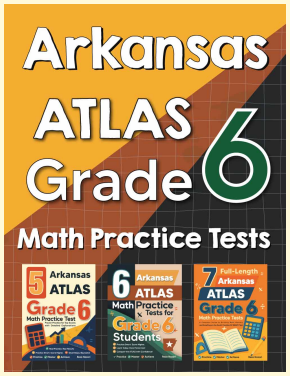

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