

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.

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|-------------------------------------|-------|------------------------------------|-------|
| 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 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. _____



Answer Keys

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|--------|----------------------|
| 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

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