Evaluating and Simplifying Expressions Worksheet

To **evaluate** an algebraic expression means to **find its value** by replacing the variable with a given number and following the **order of operations (PEMDAS)**.

Order of Operations (PEMDAS):

1. **P**arentheses
2. **E**xponents
3. **M**ultiplication and **D**ivision (left to right)
4. **A**ddition and **S**ubtraction (left to right)

Simplifying Expressions

To **simplify** an expression means to **combine like terms**.

Like terms have the **same variable raised to the same power.**

Examples:

- $4x$ and $7x$ are like terms.
- $5y$ and $-2y$ are like terms.
- $3x$ and $3y$ are **not** like terms.

Example 1 – Evaluating an Expression

Evaluate:

Step 1. Substitute 4 for xxx.

$3x + 5 \quad \text{when } x = 4$

Step 2. Multiply.

$3(4) + 5$

Step 3. Add.

$12 + 5$

Answer: 17

Example 2 – Simplifying an Expression

Simplify: $5x + 3x - 2$

Step 1. Combine like terms.

$5x + 3x = 8x$

Answer

$8x - 2$

Part A – Evaluate the Expressions

Evaluate each expression using the given value.

1. $4x + 7$ when $x = 3$

   Answer: _____

2. $6y - 5$ when $y = 8$

   Answer: _____

3. $2n + 9$ when $n = 12$

   Answer: _____

4. $5m - 11$ when $m = 9$

   Answer: _____

5. $3a^2 + 1$ when $a = 4$

   Answer: _____

6. $2b^2 - 7$ when $b = 6$

   Answer: _____

7. $x^2 + 10$ when $x = 7$

   Answer: _____

8. $5p + 2$ when $p = 11$

   Answer: _____

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9. $8k - 13$ when $k = 5$

Answer: _____

10. $4r^2 - 9$ when $r = 3$

Answer: _____

Part B – Simplify the Expressions - Combine like terms.

11. $3x + 5x$

12. $9y - 4y$

13. $6a + 8 - 2a$

14. $12m - 5 + 3m + 9$

15. $8n - 6n + 7$

16. $10p + 2 - 4p + 6$

17. $15x - 9x + 11$

18. $4y + 6 + 5y - 2$

19. $18a - 7a + 12 - 8$

20. $5m + 4m - 9 + 6$

Part C – Evaluate After Simplifying

Simplify and evaluate:

21. $4x + 6x - 3$ when $x = 2$

Simplify: _____ Evaluate: _____ Answer: _____

22. $7y - 2y + 8$ when $y = 6$

Simplify: _____ Evaluate: _____ Answer: _____

23. $9a - 4a + 5$ when $a = 3$

Simplify: _____ Evaluate: _____ Answer: _____

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24. $8m + 2m - 7$ when $m = 5$

Simplify: _____ Evaluate: _____ Answer: _____

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25. $12n - 5n + 9$ when $n = 4$

Simplify: _____ Evaluate: _____ Answer: _____

Part D – Word Problems
Write an expression and evaluate it.

26. A notebook costs **$4**. You buy **n** notebooks. Evaluate when **n = 7**.

Expression: _____ Answer: _____ $_____

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27. A plumber charges **$60** plus **$25** per hour. Evaluate the total cost for **3 hours**.

Expression: _____ Answer: _____ $_____

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28. A movie ticket costs **$12**. A popcorn costs **$6**. You buy **x** tickets. Evaluate when **x = 4**.

Expression: _____ Answer: _____ $_____

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29. A gym charges **$20** each month. Evaluate the cost for **m = 9** months.

Expression: _____ Answer: _____ $_____

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30. A taxi charges **$5** plus **$3** per mile. Evaluate the cost for **8 miles**.

Expression: _____ Answer: _____ $_____

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