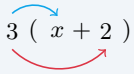
Simplifying Variable Expressions

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

To *simplify* an expression, combine *like terms* – terms with the same variable raised to the same power. First use the *distributive property* to clear parentheses ($a(b + c) = ab + ac$), then add or subtract the like terms. Constants combine with constants.

▷ **Example:** Simplify $3(2x + 4) - 5x + 7$. **Work:** Distribute the 3: $6x + 12 - 5x + 7$. Combine the x-terms: $6x - 5x = x$. Combine the constants: $12 + 7 = 19$. ★ **Answer:** $x + 19$



$= 3x + 6$

Distribute to each term, then combine.

Practice Problems

Simplify each expression.

1. $2x + 5x$ _____
2. $8a - 3a$ _____
3. $4x + 3 + 2x$ _____
4. $7y - 2 - y + 5$ _____
5. $3(x + 2)$ _____
6. $5(2x - 1)$ _____
7. $2(x + 3) + 4x$ _____
8. $6x - 2(x + 1)$ _____
9. $4(a + 2) + 3(a - 1)$ _____
10. $3x + 2y - x + 4y$ _____
11. $-2(3x - 4)$ _____
12. $5 + 2(x - 3)$ _____
13. $8m - 3(m - 2)$ _____
14. $2(x + 5) + 3(2x - 1)$ _____

Word Problems

15. A rectangle has length $x + 4$ and width 3. Write a simplified expression for its perimeter. _____
16. You buy x shirts at $\$7$ each and one $\$5$ cap. Write a simplified expression for the total cost. _____
17. There are 3 boxes that each hold $(x + 2)$ pencils, plus 4 loose pencils. Write a simplified expression for the total. _____
18. A taxi charges $\$3$ plus $\$2$ per mile, then a $\$4$ coupon is applied. Write a simplified expression for the cost of m miles. _____

Answer Keys

1. $7x$	**7.** $6x+6$	**13.** $5m+6$
2. $5a$	**8.** $4x-2$	**14.** $8x+7$
3. $6x+3$	**9.** $7a+5$	**15.** $2x+14$
4. $6y+3$	**10.** $2x+6y$	**16.** $7x+5$
5. $3x+6$	**11.** $-6x+8$	**17.** $3x+10$
6. $10x-5$	**12.** $2x-1$	**18.** $2m-1$

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is These are like terms, so just add the coefficients: $2x+5x=7x$. So the final answer is $7x$.

2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Both terms have a, so subtract the coefficients: $8a-3a=5a$. So the final answer is $5a$.

3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Group the x-terms and the numbers: $(4x+2x)+3=6x+3$. So the final answer is $6x+3$.

4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine the y-terms ($7y-y=6y$) and the constants ($-2+5=3$): $6y+3$. So the final answer is $6y+3$.

5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the 3 to each term inside: $3\cdot x+3\cdot 2=3x+6$. So the final answer is $3x+6$.

6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the 5: $5\cdot 2x-5\cdot 1=10x-5$. So the final answer is $10x-5$.

7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute first: $2x+6$. Then add the $4x$: $2x+4x+6=6x+6$. So the final answer is $6x+6$.

8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the -2: $6x-2x-2$. Combine: $4x-2$. So the final answer is $4x-2$.

9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute both: $4a+8$ and $3a-3$. Combine: $(4a+3a)+(8-3)=7a+5$. So the final answer is $7a+5$.

10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine the x-terms ($3x-x=2x$) and the y-terms ($2y+4y=6y$): $2x+6y$. So the final answer is $2x+6y$.

11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A negative multiplier flips each sign: $-2\cdot 3x=-6x$ and $-2\cdot(-4)=+8$, giving $-6x+8$. So the final answer is $-6x+8$.

12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute: $5+2x-6$. Combine the constants $5-6=-1$: $2x-1$. So the final answer is $2x-1$.

13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the -3: $8m-3m+6$. Combine: $5m+6$. So the final answer is $5m+6$.

14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute both: $2x+10$ and $6x-3$. Combine: $(2x+6x)+(10-3)=8x+7$. So the final answer is $8x+7$.

15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Perimeter is $2(\text{length}+\text{width})=2((x+4)+3)=2(x+7)=2x+14$. So the final answer is $2x+14$.

16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Each shirt costs \$7, so x shirts cost $7x$; add the \$5 cap: $7x+5$. So the final answer is $7x+5$.

17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Three boxes give $3(x+2)=3x+6$ pencils; add the 4 loose ones: $3x+10$. So the final answer is $3x+10$.

18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The cost is $3+2m$, then subtract the \$4 coupon: $3+2m-4=2m-1$. So the final answer is $2m-1$.

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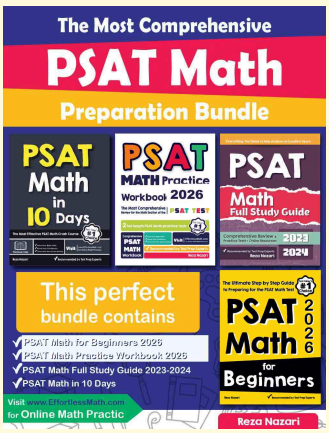

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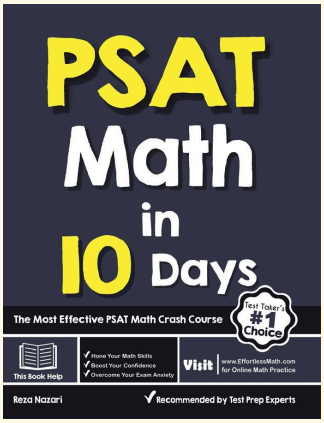

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