

SECTION
6**Ready to Go On? Intervention: Algebra****Lesson 5: Order of Operations**

Some expressions have more than one operation. A set of rules called the **order of operations** tells us how to evaluate them.

When an expression has more than one operation, do the operations in the following order.

Order of Operations
1. Evaluate expressions inside parentheses.
2. Evaluate expressions with exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

EXAMPLE

$$\begin{array}{l}
 (5 - 2) + 6^2 \cdot 4 \\
 \downarrow \text{Parentheses} \\
 = 3 + 6^2 \cdot 4 \\
 \downarrow \text{Exponents} \\
 = 3 + 36 \cdot 4 \\
 \downarrow \text{Multiply, Divide} \\
 = 3 + 144 \\
 \downarrow \text{Add, Subtract} \\
 = 147
 \end{array}$$

HINT

If there is addition and subtraction in the same expression, do them from left to right. For example, in $18 - 4 + 2$, do the subtraction first. In $18 + 2 - 4$, do the addition first. The same is true for multiplication and division.

You can use the sentence “Please excuse my dear Aunt Sally” to help you remember the order of operations.

Practice: First Try

For each expression, tell which operation you would do first.

1. $4^3 + 9 - 3$

2. $20 - (4 + 7)$

3. $24 \div 6 + 7$

4. $6 - 1 + 5$

5. $(3 - 1) + 4^2$

6. $2^4 - 3^2$

Evaluate the expression. Use the order of operations.

7. $10 \times (6 - 2)$

8. $5^2 - (4 + 3)$

9. $12 \div 4 \times 2^3$

10. $(12 + 4) \div 2^2$

11. $(9 - 1)(2 + 6)$

12. $8 + 7 - 1 \cdot 4$

Name _____

Date _____

Practice: Second Try**Evaluate the expression. Use the order of operations.**

1. $(15 - 4) + 3^3$

2. $6^2 - (10 + 2)$

3. $5 + 7 - 2$

4. $16 - 4 \times 3$

5. $15 \div 3 - 1$

6. $15 - 3^2 + 4$

7. $9^2 + (2)(5)$

8. $12 + 9 - 4^2$

9. $(10 \div 2) + 4^2$

10. $(8 - 3) + 2^3 \cdot 5$

11. $36 \div 4 - 3^2$

12. $3 \cdot 4 \div 2$

13. $5^2 + 4(7 + 3)$

14. $9 - 8 \div 2^2$

15. $19 - 4(2 + 1)$

16. $4^2 + 3 \cdot 5$

17. $32 \div 2^3 + 3$

18. $8 + 8 - 3 \cdot 5$

19. $11 + 24 \div 4 - 8$

20. $6 \times 2 + (8 - 7) + 2^4$

21. $6 + 1^4 + (20 - 2)$

22. $\frac{3 \times 2^4 + 1}{7}$

23. $\frac{100}{6^2 + 4^3}$

24. $\frac{5 + 2^2}{9 - 6}$

Extend Your Skills

25. Copy the two lines below.

Please Excuse My Dear Aunt Sally.

Parentheses Exponents Multiply Divide Add Subtract

Show or explain how the first line helps you remember the order of operations below it. Now make up your own phrase or sentence to remember the order of operations.

26. Chester paid a \$30 membership fee to a toddler gym and \$8 for each of 6 tumbling classes for his son. The expression $30 + 8 \times 6$ can be used to evaluate the total cost of the program. Is the cost \$228 or \$78? Explain.

Puzzle

Insert operation symbols like exponents, $()$, $+$, $-$, \times and \div to create true expressions.

1 2 3 4 5 = 0

5 4 3 2 1 = 50