ORDER OF OPERATIONS

The first step is to organize the numerical expression into parts called terms, which are single numbers or products of numbers. A numerical expression is made up of a sum or difference of terms.

Examples of numerical terms are: 4, $3(6)$, $6(9-4)$, $2 \cdot 3^2$, $3(5+2^3)$, and $\frac{16-4}{6}$.

For the problem above, $3 + 4 \cdot 2$, the terms are circled at right. $\textcircled{3} + \textcircled{4 \cdot 2}$

Each term is simplified separately, giving $3 + 8$. Then the terms are added: $3 + 8 = 11$.
Thus, $3 + 4 \cdot 2 = 11$.

Example 1

To evaluate an expression: $2 \cdot 3^2 + 3(6-3) + 10$

- Circle each term in the expression.
- Simplify each term until it is one number by:
  - Simplifying the expressions within the parentheses.
  - Evaluating each exponential part (e.g., 3^2).
  - Multiplying and dividing from left to right.
- Finally, combine terms by adding or subtracting from left to right.

$\textcircled{2 \cdot 3^2} + \textcircled{3(6-3)} + \textcircled{10}$

$\textcircled{2 \cdot 3^2} + \textcircled{3(3)} + \textcircled{10}$

$\textcircled{2 \cdot 9} + \textcircled{3(3)} + \textcircled{10}$

$\textcircled{18} + \textcircled{9} + \textcircled{10}$

$27 + 10$

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Example 2

$5 - 8 \div 2^2 + 6(5+4) - 5^2$

a. Circle the terms.

b. Simplify inside the parentheses.

c. Simplify the exponents.

d. Multiply and divide from left to right.

Finally, add and subtract from left to right.

a. $\textcircled{5} - \textcircled{8 \div 2^2} + \textcircled{6(5+4)} - \textcircled{5^2}$

b. $\textcircled{5} - \textcircled{8 \div 2^2} + \textcircled{6(9)} - \textcircled{5^2}$

c. $\textcircled{5} - \textcircled{8 \div 4} + \textcircled{6(9)} - \textcircled{25}$

d. $5 - 2 + 54 - 25$

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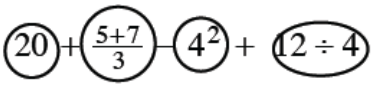
Example 3

$20 + \frac{5+7}{3} - 4^2 + 12 \div 4$

a. Circle the terms.

a. 

b. Multiply and divide left to right, including exponents.

b. $20 + 4 - 16 + 3$

Add or subtract from left to right.

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Problems

Circle the terms, then simplify each expression.

1. $5 \cdot 3 + 4$
2. $10 \div 5 + 3$
3. $2(9 - 4) \cdot 7$
4. $6(7 + 3) + 8 \div 2$
5. $15 \div 3 + 7(8 + 1) - 6$
6. $\frac{9}{3} + 5 \cdot 3^2 - 2(14 - 5)$
7. $\frac{20}{6+4} + 7 \cdot 2 \div 2$
8. $\frac{5+30}{7} + 6^2 - 18 \div 9$
9. $2^3 + 8 - 16 \div 8 \cdot 2$
10. $25 - 5^2 + 9 - 3^2$
11. $5(17 - 7) + 4 \cdot 3 - 8$
12. $(5 - 2)^2 + (9 + 1)^2$
13. $4^2 + 9(2) \div 6 + (6 - 1)^2$
14. $\frac{18}{3^2} + \frac{5 \cdot 3}{5}$
15. $3(7 - 2)^2 + 8 \div 4 - 6 \cdot 5$
16. $14 \div 2 + 6 \cdot 8 \div 2 - (9 - 3)^2$
17. $\frac{27}{3} + 18 - 9 \div 3 - (3 + 4)^2$
18. $26 \cdot 2 \div 4 - (6 + 4)^2 + 3(5 - 2)^3$
19. $\left(\frac{42+3}{5}\right)^2 + 3^2 - (5 \cdot 2)^2$

answers on next page…

Answers

1. 19	2. 5	3. 70	4. 64	5. 62
6. 30	7. 9	8. 39	9. 12	10. 0
11. 54	12. 109	13. 44	14. 5	15. 47
16. –5	17. –25	18. – 6	19. –10	