

## 1.2 Order of Operations



When solving an expression, we must follow a set order. The initials **PEMDAS** help us remember this order.

**Parentheses** – any grouping (also includes brackets)

**Exponents**

**Multiplication and Division** – in the order that they appear

**Addition and Subtraction** – in the order that they appear

$$[2 \times (3 + 3)] - 8$$

**Parentheses** are solved first. When there are two sets of parentheses, inner parentheses come before outer.

$$[2 \times (3 + 3)] - 8$$

**Parentheses** before **subtraction**:  $[2 \times 6] - 8 = 4$

$$\frac{23 - 7}{4} + 5(6)$$

**Parentheses** are solved first, which includes any groupings such as above or below a division bar.

$$\frac{23 - 7}{4} + 5(6)$$

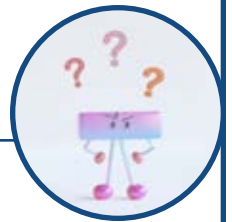
**Multiplication and division** before **addition**:

$$\frac{16}{4} + 5(6)$$
$$4 \quad 30$$
$$4 + 30 = 34$$

## Check-in

Use the order of operations to simplify.

1.  $4 + 15 \div 3$  \_\_\_\_\_
2.  $8 - 2 \times 2$  \_\_\_\_\_
3.  $5(1 + 3)$  \_\_\_\_\_



## Practice

Use the order of operations to solve the following expressions.

1.  $2 \times 8 - 3$  \_\_\_\_\_
2.  $12 - 8 \div 2 + 3$  \_\_\_\_\_
3.  $15 - 3 \times 2$  \_\_\_\_\_
4.  $20 \div (2 + 3)$  \_\_\_\_\_
5.  $12 - 2 \times [12 - (3 \times 3)]$  \_\_\_\_\_
6.  $18 \div (6 - 3) + 2$  \_\_\_\_\_
7.  $(7 + 4) \times 9 - 5$  \_\_\_\_\_
8.  $10 \times (3 - 1) + 5$  \_\_\_\_\_
9.  $2(5) + \frac{7+8}{3}$  \_\_\_\_\_
10.  $24 \div (4 + 2) - 1$  \_\_\_\_\_
11.  $16 - 2 \times [16 \div (8 - 4)]$  \_\_\_\_\_
12.  $9 + 6 \div (6 - 4)$  \_\_\_\_\_
13.  $(6 - 2) \times 11 - 3$  \_\_\_\_\_
14.  $15 - 2 \frac{8-2}{3}$  \_\_\_\_\_
15.  $10 + 2 \times (8 \div 4)$  \_\_\_\_\_
16.  $18 \div (2 + 1) - 3$  \_\_\_\_\_
17.  $7 - 2 \times [6 - (2 + 1)]$  \_\_\_\_\_
18.  $3(6) - \frac{4+6}{2}$  \_\_\_\_\_
19.  $16 + 5 \div (2 - 1)$  \_\_\_\_\_
20.  $7 + 3 \times (8 \div 4)$  \_\_\_\_\_

Compare, using the  $>$ ,  $<$ , or  $=$  sign.

21.  $15 \times 3 - 2$  \_\_\_\_\_  $15 \times (3 - 2)$
22.  $10 \times (4 - 3)$  \_\_\_\_\_  $10 \times 4 - 3$
23.  $12 \div (2 + 4)$  \_\_\_\_\_  $12 \div 2 + 4$
24.  $18 \div 3 + 3$  \_\_\_\_\_  $18 \div (3 + 3)$
25.  $6 + 4 \div 2$  \_\_\_\_\_  $(6 + 4) \div 2$

Write an expression for each phrase and then solve.

1. 4 added to the product of 3 and 9 \_\_\_\_\_
2. 20 minus the sum of 3 and 5 \_\_\_\_\_
3. 7 times the sum of 4 and 6 \_\_\_\_\_
4. Double the difference of 10 and 3 \_\_\_\_\_
5. Three times the difference of 15 and 7 \_\_\_\_\_
6. A teacher worked 5 hours on Sunday and 6 hours each day for the next 3 days.  
Write and solve an expression that shows the total number of hours worked.  
\_\_\_\_\_
7. A rectangle has a length of 12 inches and a width of 7 inches.  
Write and solve an equation to find the perimeter of the rectangle.  
\_\_\_\_\_

### *Key Points*

The order of operations is **PEMDAS**: **P**arentheses, **E**xponents, **M**ultiplication and **D**ivision, **A**ddition and **S**ubtraction.

