1.1 (Page 15) Order of Operations

The ORDER OF OPERATIONS rule guarantees that each numerical expression has a unique value.

First: Do all multiplication & divisions from left to right.

Second: Do all additions and subtractions from left to right.

1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$7 \times 3 + 5$

$21 + 5$

26

1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$18 - 6 + 4 \times 3$

$18 - 6 + 12$

$12 + 12$

24

1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$12 \div 4 + 5 \times 2 - 24 \div 6$

$3 + 5 \times 2 - 24 \div 6$

$3 + 10 - 24 \div 6$

$3 + 10 - 4$

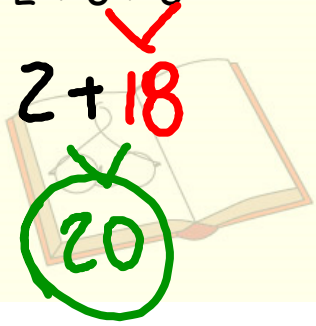
$13 - 4 = 9$

1.1 (Page 15) Order of Operations

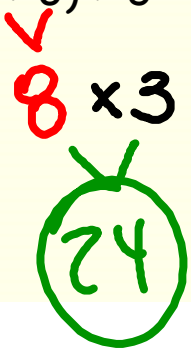
The order of operations can be changed by using grouping symbols such as parentheses () and brackets [].

For example, the value of the expression (2 + 6) × 3 changes with and without the parentheses:

$2 + 6 \times 3$



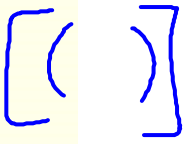
$(2 + 6) \times 3$



1.1 (Page 15) Order of Operations

The order for performing the operations in an expression is summarized as follows:

1. Do all operations within grouping symbols first. Start with the innermost grouping symbols.



2. Next, do all multiplications and divisions from left to right.

3. Then, do all additions and subtractions from left to right.

1.1 (Page 15) Order of Operations

In algebra, there are many ways to indicate multiplication & division.

A raised dot or parentheses can be used to indicate multiplication:

$8 \cdot 7 \Longrightarrow 8 \times 7$

$3(4)$, $(3)4$, or $(3)(4) \Longrightarrow 3 \times 4$

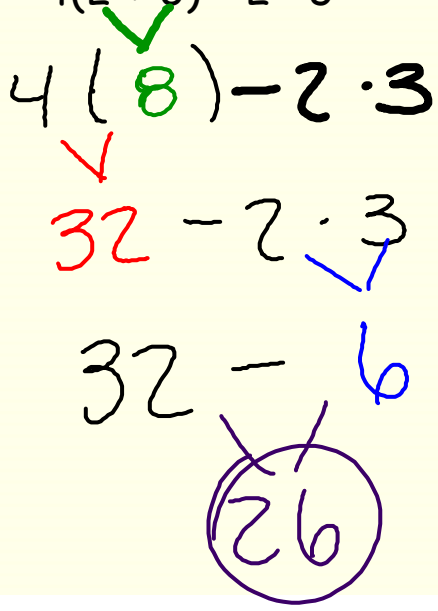
A fraction bar can be used to indicate division:

$\frac{26 - 2}{4 + 8} \Longrightarrow (26 - 2) \div (4 + 8)$

1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$4(2 + 6) - 2 \cdot 3$



1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$3[(7+5) \div 4(2)]$

$3[12 \div 4(2)]$

$3[3(2)]$

$3[6]$

18

1.1 (Page 15) Order of Operations

Example: Find the value of each expression.

$\frac{19+2}{11-8} = \frac{21}{3} = 7$

$(19+2) \div (11-8)$

$21 \div (11-8)$

$21 \div 3$

7