

Order of Operations

Objective 1: Simplify Expressions using the Order of Operations

Order of Operations

1. Apply Steps 2 thru 4 to all math operations that are located within any grouping symbols.

Grouping symbols include: **P**arentheses (), **B**rackets [], **B**races { }, absolute value | |, square roots $\sqrt{\quad}$, and fraction bars $\frac{\text{TOP GROUP}}{\text{BOTTOM GROUP}}$

When grouping symbols are embedded in other grouping symbols, work from the inside out.

2. Evaluate any numbers with **E**xponents or **R**oots.
3. Do all **M**ultiplications and **D**ivisions working from left to right.
4. Do all **A**dditions and **S**ubtractions working from left to right.

P E M D A S

Please Excuse My Dear Aunt Sally

Ex) Simplify each expression.

(a) $18 - 3 \cdot 4$

(b) $5 + 10 \div 2 \times 3$

(c) $7 + 15 \cdot 3 + \frac{9}{3}$

(d) $6 + 7 - (-3)$

(e) $9 \cdot 2 + 8 \cdot 3 + 15$

(f) $30 - 24 \div 4 \times 3$

Extra Practice

Objective 1: Simplify Expressions using the Order of Operations

Pause the video and try these problems.

Simplify each of the following.

1. $20 + 35 \div 7 \times 5$

2. $42 - 3 \cdot 11$

3. $35 + 15 \cdot 3 + \frac{20}{4}$

Restart when you are ready to check your answers.

Objective 2: Simplifying Expressions involving Exponents and Roots

Ex) Simplify each expression.

(a) $58 - 3 \cdot 7\sqrt{4} \div \sqrt{36}$

(b) $4^3 \cdot 3^2 \div 12$

(c) $\sqrt{144} - 6^2 \div 4 \cdot 7$

(d) $\sqrt{\frac{25}{36}} - \left(\frac{1}{3}\right)^2$

Objective 2: Order of Operations: Expressions involving Exponents and Roots

Pause the video and try these problems.

Simplify each of the following.

1. $7^2 \cdot 2^3 \div 14 + 9$

2. $\sqrt{100} + 6^2 \div 2 \cdot 5$

3. $85 - 3 \cdot 2\sqrt{16} \div 6$

Restart when you are ready to check your answers.

Objective 3: Simplifying Expressions involving Parentheses

Ex) Simplify each expression.

(a) $25 - 4(5^2 - 20)$

(b) $5 + 2(\sqrt{25} \cdot 4 + 3^3)$

(c) $2\sqrt{36} \cdot \sqrt{121} - 3^2(5 + 2 \cdot 3)$

$$(d) \left(\frac{3}{5} - \frac{1}{2}\right)^2 + \frac{2}{3} \div \frac{4}{3}$$

$$(e) -7.2 + 0.1(-3 + 1.2)$$

Objective 3: Order of Operations: Expressions involving Parenthesis

Pause the video and try these problems.

Simplify each of the following.

1. $75 - 5(29 - 2^3 \cdot 3)$

2. $7(41 - 3^3) + 7\sqrt{25}$

3. $\sqrt{4} \cdot 9 + 3(5 + 3^2)$

4. $15 + 3(12 - 7)$

5. $5\sqrt{169} \cdot \sqrt{4} - 4^2(22 - 3 \cdot 5)$

Restart when you are ready to check your answers.

Objective 4: Simplifying Expressions involving Quotients

Ex) Simplify each expression.

$$(a) \frac{3 - (-6)}{6 + (-3)^2}$$

$$(b) \frac{8 + (-2)(4)}{18}$$

$$(c) \frac{3 - 7^2}{4 + 2(6)}$$

$$(d) \frac{5 + 2(7 - 11)}{9 - 3^2}$$

Objective 4: Simplifying Expressions involving Quotients

Ex) Simplify each expression.

$$(a) \frac{3 - (-6)}{6 + (-3)^2}$$

$$(b) \frac{8 + (-2)(4)}{18}$$

$$(c) \frac{3 - 7^2}{4 + 2(6)}$$

$$(d) \frac{5 + 2(7 - 11)}{9 - 3^2}$$

Objective 4: Order of Operations: Expressions involving Quotients

Pause the video and try these problems.

Simplify each of the following.

1. $\frac{-18-3(4)}{4^2-2(3)}$

2. $\frac{1+(-16)\div 8}{3-7}$

3. $\frac{19-5^2}{2-7(8)}$

4. $\frac{9-6(14-20)}{5+(-2)^2}$

Restart when you are ready to check your answers.

Objective 5: Simplifying Expressions involving Absolute Value

Ex) Simplify each expression.

(a) $|7 - 20|$

(b) $10 - |-4|$

(c) $5 - 2|3|$

(d) $-|5.1 - 4.3|$

(e) $\frac{|3 - 5| - 8}{4 - 16}$

Objective 5: Order of Operations: Expressions involving Absolute Value

Pause the video and try these problems.

Simplify each of the following.

1. $|1-14|$

2. $2-|-20|$

3. $|15|-7|-6|$

4. $4.3-|1.8+9.6|$

5. $\frac{|4^2-5^2|-6}{4+2(-3)}$

Restart when you are ready to check your answers.