

CHS Ninth Grade Academy 2020 Algebra I Summer Packet

Order of Operations

Directions: Using the below example, evaluate the following expressions.

Definition: The rules which determine which calculation comes first in an expression.

PEMDAS:

- do everything inside **parentheses** first: ()
- then do **exponents**, second: x^2 , x^3
- then do **multiplies** and **divides** next from left to right
- then do the **adds** and **subtracts** last from left to right

Example:

$$\begin{aligned} &5 \times (3 + 4) - 2 \times 8 \\ &= 5 \times 7 - 2 \times 8 \\ &= 35 - 16 \end{aligned}$$

1) $14 \div 7 + 3^2$ 2) $42 \div 2(-12 + 9)$ 3) $\sqrt{49}$ 4) $|-14|$

5) $18 - 30 \div 5$ 6) $48 \div (5 + 7) - 9$ 7) $4^3 - 5(2) + 13$

Adding/Subtracting/Multiplying/Dividing Positive and Negative Numbers

Directions: Using the below rules, evaluate each expression.

Rule	Example
Positive + Positive = Positive	$6 + 2 = 8$
Negative + Negative = Negative	$(-5) + (-1) = -6$
To determine the sum of a negative number and a positive number use the sign of the larger number and subtract	$(-8) + 3 = -5$ $6 + (-2) = 4$

Negative – Positive = Negative	$(-5) - 3 = -5 + (-3) = -8$
Positive – Negative = Positive + Positive = Positive	$5 - (-3) = 5 + 3 = 8$
Negative – Negative = Negative + Positive = <i>Use the sign of the larger number and subtract; double negatives becomes positive</i>	$(-5) - (-3) = (-5) + 3 = 2$ $(-3) - (-5) = (-3) + 5 = 2$
Positive x Positive = Positive	$5 \times 5 = 25$
Negative x Negative = Positive	$(-6) \times (-3) = 18$
Positive ÷ Positive = Positive	$25 \div 5 = 5$
Negative ÷ Negative = Positive	$(-18) \div (-3) = 6$
Negative ÷ Positive = Negative	$(-10) \div 2 = -5$
Positive ÷ Negative = Negative	$21 \div (-3) = -7$

8) $-2 + 11 - 7$

9) $5 - 3 + 12 - (-9)$

10) $\frac{-4}{\left(\frac{3}{4}\right)}$

11) $(-2)(4)(-5)(-1)$

12) $-4 + -9 - 3(-6)$

13) $\left(\frac{3}{5}\right)\left(-\frac{7}{12}\right)$

14) $\frac{3}{4} + \frac{1}{6}$

15) $2\frac{1}{3} - \frac{7}{9}$

16) $\left(\frac{2}{3}\right) \div \left(1\frac{5}{9}\right)$

Evaluating Expressions

Directions: Replace each letter with the assigned value. Use the correct order of operations (PEMDAS) to evaluate the expression.

Evaluating Expressions Example

$4(n-1) + 5n$, when $n = 2$

$4 \times 1 + 10$

$4 + 10 = 14$

17) $3(n - 1) + 2n$, when $n = 5$

18) $7b - 2a$, when $a = -3$ and $b = 4$

19) $3x^2 + 5x + 1$, when $x = -2$

20) $\frac{2r}{t} + 7$, when $r = 12$ and $t = 3$

21) $(3x)^2 - 7y^2$, when $x = 3$ and $y = 2$

22) $4(3d + 6) - 2d$, when $d = -6$

Solving Equations**Directions:** Solve each equation. Include a check.

Example:

$3b + 2 = 6(3 - b)$ $3b + 2 = 18 - 6b$ $\begin{array}{r} -2 \quad -2 \\ \hline 3b = 16 - 6b \\ +6b \quad +6b \\ \hline 9b = 16 \\ \frac{9b}{9} = \frac{16}{9} \\ b = \frac{16}{9} \end{array}$	Check: Does $3\left(\frac{16}{9}\right) + 2 = 6\left(3 - \left(\frac{16}{9}\right)\right)$? $\frac{16}{3} + 2 = 6\left(\frac{11}{9}\right)$ $\frac{16}{3} + \frac{6}{3} = \frac{22}{3}$ $\frac{22}{3} = \frac{22}{3} \checkmark$
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23) $14 = b + 5$

24) $5r = 22$

25) $\frac{x}{4} = -9$

26) $3x - 5 = 13$

27) $\frac{1}{4}d + 2 = 3$

28) $-21 - 5x = 64$

29) $3y + 2y = 81 - 6$

30) $18y - 21 = 15y + 3$

31) $\frac{2a}{7} = \frac{2}{3}$

32) $2x - 10 + 2 = 12$

33) $3(y - 4) = -2y - 12$

34) $\frac{4x}{7} = \frac{6}{5}$

Properties

Directions: Match each equation on the left with the property it illustrates on the right. Use the below definitions.

Commutative Property	$a + b = b + a$
Identity Property of Multiplication	$a \times 1 = a$
Associative Property	$(a + b) + c = a + (b + c)$
Distributive Property	$a(b + c) = ab + ac$
Identity Property of Addition	$a + 0 = a$

35) $4 + (9 + 6) = (4 + 9) + 6$

A. Identity Property of Addition

36) $x + 12 = 12 + x$

B. Associative Property

37) $(3 + y) + 0 = 3 + y$

C. Distributive Property

38) $x \cdot 1 = x$

D. Identity Property of Multiplication

39) $5(x + y) = 5x + 5y$

E. Commutative Property

Distributive Property

Directions: Simplify each expression using the distributive property.

Distributive Property Example

$4(x + 5) = 4(x) + 4(5) = 4x + 20$

40) $3(b + 9)$

41) $5(2x - 3)$

42) $-3(4x + 9)$

43) $x(2x + 4)$

44) $\frac{1}{2}(4r + 12)$

45) $-(6p - 11)$

Simplifying Expressions

Directions: Simplify each expression by distributing and combining like terms.

Simplified Expression Example

$7x - 4y + 2x - y$, so...
 $7x + 2x = 9x$, $-4y + -y = -5y$
...therefore $9x - 5y$

46) $4x + 7y - 14x + 2y$

47) $-3(2x - 5y)$

48) $9(6 + 2y) - 5 + 2y$

49) $2(3x - 1) + 3(x + 7)$

50) $20xy + 3x^2y - 10x^2y - 30xy$