



# GNBVT 9<sup>th</sup> Grade Summer Algebra Packet

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*Each Objective in this packet will provide a search topic for you to use in Khan Academy to help retrieve tutorials on that topic.*

**In order to receive CREDIT you MUST show ALL WORK**

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## Review of Introductory Algebra Topics I

**Objectives:** The student through this individual guided assignment will be able to:

1. Find the Least Common Multiple between a series of numbers.
2. Add, subtract, multiply and divide fractions.
3. Add, subtract, multiply and divide integers.
4. Simplify and expression using order of operations.
5. Evaluate expressions involving exponents with numerical bases.
6. Understand the rules of even and odd powers involving negative numbers.
7. Calculate the absolute value in an expression.
8. Evaluate algebraic expressions for given numeric values.
9. Convert word phrases to mathematical expression.
10. Solve 1 and 2 Step Equations

## OBJECTIVE 1: Find the Least Common Multiple between a series of numbers

[Khan Academy Search Topic: LCM between numbers](#)

### Least Common Multiple

- A Multiple of a number is the product of the number and any whole number.
  - Example: number x number = product (multiple)
- When you count by twos, fives or tens, you are using multiples.
- 2: 2, 4, 6, 8, 10, 12 multiples of two
- 4: 4, 8, 12, 16, 20 multiples of four
- 5: 5, 10, 15, 20, 25 multiples of five

**LEAST  
COMMON  
MULTIPLE**

The Least Common Multiple or the LCM is the lowest number you get when you compare the multiples of numbers.

Ex. 1: Find the LCM of 10 and 30

10: 10, 20, **30**, 40, 50  
30: **30**, 60, 90

So the LCM is **30** because **30** is the lowest number in the list of multiples

Ex. 2: Find the LCM of 12 and 18

12: 12, 24, **36**, 48  
18: 18, **36**, 54

So the LCM is **36** because **36** is the lowest number in the list of multiples.

**MULTIPLES OF 8**  
8, 16, 24, 32, 40, 48, **56**

**MULTIPLES OF 14**  
14, 28, 42, **56**

### Least Common Multiple

- Ex.3 Find the LCM of 5 and 7
- Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40
- Multiples of 7 are 7, 14, 21, 28, 35, 42

Can you find the multiple? The lowest number that is the same in both list.

The answer is 35. SOOOO the LCM is 35!!! Easy right!!

**LCM**  
LEAST COMMON MULTIPLE

## 8th Grade going into 9th Grade Algebra

## Summer Packet 2018

**Objective #1 . Use the notes from Objective #1 to find the LCM of each.**

1) 10, 16

- A) 2      B) 74  
C) 80     D) 160

2) 30, 40

- A) 83      B) 1200  
C) 120     D) 10

3) 22, 8

- A) 88      B) 2  
C) 352     D) 176

4) 6, 15

- A) 30      B) 90  
C) 3       D) 120

5) 14, 21

- A) 7        B) 21  
C) 294     D) 42

6) 16, 40

- A) 640     B) 42  
C) 8        D) 80

7) 12, 4, 10

- A) 480     B) 60  
C) 2        D) 12

8) 12, 8, 16

- A) 48      B) 1536  
C) 144     D) 4

9) 12, 8, 20

- A) 4        B) 30  
C) 120     D) 1920

10) 15, 12, 18

- A) 3240    B) 18  
C) 180     D) 3

## OBJECTIVE 2: Add, subtract, multiply and divide fractions.

Remember the parts of a fraction:

$$\frac{3}{5} \quad \begin{array}{l} \leftarrow \text{numerator} \\ \leftarrow \text{denominator} \end{array}$$

### Adding and Subtracting Fractions :

[Khan Academy Search Topic: Add & Subtract Fractions](#)

**\*\*Denominators must be the same in order to add or subtract!**

#### Adding/Subtracting Fractions with a Common Denominator

1. Add/Subtract the numerators.
2. Keep the denominator the same.
3. Simplify if needed.

Examples:

$$1. \quad \frac{3}{5} + \frac{1}{5} = \frac{4}{5}$$

$$2. \quad \frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$$

#### Adding/Subtracting Fractions with Different Denominators

1. Rewrite using a common denominator.
2. Add/Subtract the fractions.
3. Simplify if needed.

*Remember:* To add and subtract when denominators are not the same, you must first find the Least Common Denominator (LCD same as LCM) and rewrite each fraction to have that denominator.

Examples:

#### 1. Adding and subtracting simple fractions

We can use **equivalent** fractions to add fractions that do not have the same **denominator**.

For example:

$$\frac{3}{4} + \frac{1}{8}$$

We need to change  $\frac{3}{4}$  into an equivalent fraction with a denominator of 8.

$$\frac{3}{4} = \frac{6}{8}$$

(Note: An arrow labeled 'x2' points from 3 to 6, and another arrow labeled 'x2' points from 4 to 8.)

Now we have:

$$\frac{6}{8} + \frac{1}{8} = \frac{7}{8}$$

**Denominator** – The bottom number of a fraction.

**Numerator** – The top number of a fraction.

**Equivalent** – The same as.

#### 2. Adding and Subtracting Unlike Fractions

Find the difference.  $\frac{5}{6} - \frac{7}{8}$

*Step 1* The LCD is 24.

$$\text{Step 2} \quad \frac{5}{6} = \frac{5 \cdot 4}{6 \cdot 4} = \frac{20}{24} \quad \frac{7}{8} = \frac{7 \cdot 3}{8 \cdot 3} = \frac{21}{24}$$

*Step 3* Subtract the numerators. Write the difference over the common denominator.

$$\frac{5}{6} - \frac{7}{8} = \frac{20}{24} - \frac{21}{24} = \frac{20-21}{24} = -\frac{1}{24}$$

(Note: A red bracket above the 20 and 21 indicates subtraction, and a blue bracket below the 20 and 21 indicates the common denominator.)

## Multiplying and Dividing Fractions:

*[Khan Academy Search Topic: Multiply & Divide Fractions](#)*

### *Multiplication Steps:*

Multiply the numerators	$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$
Multiply the denominators	$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$
Reduce the fraction if necessary	$\frac{6}{20} = \frac{3}{10}$

Examples:

1.  $\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$
2.  $\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} = \text{reduces to } \frac{1}{6}$

### *Division Steps:*

Invert the fraction that you are dividing by	$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$
Multiply the numerators and denominators	$\frac{4}{5} \times \frac{3}{2} = \frac{12}{10}$
Simplify the fraction if necessary	$\frac{12}{10} = 1\frac{1}{5}$

Examples:

1.  $\frac{2}{5} \div \frac{2}{3} = \frac{2}{5} \times \frac{3}{2} = \frac{2 \times 3}{5 \times 2} = \frac{6}{10} = \frac{3}{5}$   
 take the reciprocal of the divisor
2.  $\frac{4}{7} \div 2 = \frac{4}{7} \times \frac{1}{2} = \frac{4 \times 1}{7 \times 2} = \frac{4}{14} = \frac{2}{7}$

**Objective #2 . Use the notes from Objective # 2 to either Add, Subtract, multiply or Divide Fractions.**

11)  $\frac{5}{3} - \frac{4}{3}$

- A)  $\frac{2}{3}$       B)  $\frac{1}{3}$   
C)  $\frac{7}{3}$       D) 1

12)  $7 - \frac{2}{3}$

- A)  $\frac{163}{21}$       B)  $\frac{20}{3}$   
C)  $\frac{23}{12}$       D)  $\frac{19}{3}$

13)  $2 + \frac{5}{4}$

- A)  $\frac{17}{4}$       B)  $\frac{7}{4}$   
C)  $\frac{13}{4}$       D)  $\frac{77}{20}$

14)  $\frac{5}{7} - \frac{3}{8}$

- A) 2      B)  $\frac{19}{56}$   
C)  $\frac{61}{56}$       D)  $\frac{365}{168}$

15)  $\frac{9}{5} + \frac{1}{2}$

- A)  $\frac{3}{10}$       B)  $\frac{33}{10}$   
C)  $\frac{9}{5}$       D)  $\frac{23}{10}$

16)  $\frac{4}{5} - \frac{1}{4}$

- A)  $\frac{51}{20}$       B) 3  
C)  $\frac{21}{20}$       D)  $\frac{11}{20}$

17)  $\frac{1}{6} \cdot \frac{4}{3}$

A)  $\frac{28}{15}$

B)  $\frac{3}{2}$

C)  $\frac{1}{8}$

D)  $\frac{2}{9}$

18)  $\frac{3}{2} \cdot \frac{9}{7}$

A)  $\frac{6}{7}$

B)  $\frac{39}{14}$

C)  $\frac{4}{3}$

D)  $\frac{27}{14}$

19)  $\frac{4}{5} \cdot \frac{5}{3}$

A)  $\frac{4}{3}$

B)  $\frac{4}{9}$

C)  $\frac{9}{8}$

D)  $\frac{25}{12}$

20)  $3 \cdot \frac{2}{7}$

A)  $\frac{32}{21}$

B)  $\frac{34}{9}$

C)  $\frac{33}{14}$

D)  $\frac{6}{7}$

21)  $\frac{3}{8} \div 2$

A)  $\frac{11}{10}$

B)  $\frac{19}{8}$

C)  $\frac{3}{16}$

D)  $\frac{1}{2}$

22)  $9 \div \frac{3}{4}$

A) 12

B)  $\frac{33}{4}$

C)  $\frac{39}{4}$

D)  $\frac{12}{7}$

23)  $\frac{1}{2} \div \frac{8}{9}$

A)  $\frac{1}{5}$

B)  $\frac{9}{16}$

C)  $\frac{25}{18}$

D)  $\frac{5}{8}$

24)  $\frac{2}{5} \div \frac{5}{7}$

A)  $\frac{7}{6}$

B)  $\frac{14}{25}$

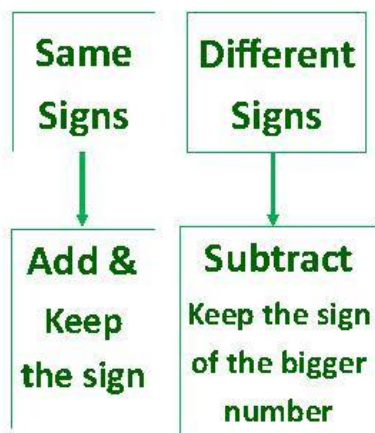
C)  $\frac{1}{3}$

D)  $\frac{5}{4}$

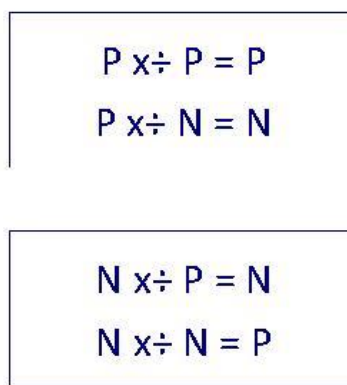
## OBJECTIVE 3: Add, Subtract, Multiply and Divide Integers

# Operations With Integers

## Add & Subtract



## Multiply & Divide



### Add & Subtract Examples:

[Khan Academy Search Topic: Add & Subtract Integers](#)

Same Signs: 1.  $-5 - 6 = -11$

2.  $-4 + (-6) = -10$

3.  $3 + 7 = 10$

\*4.  $3 - (-7) = 3 + (+7) = 10$

Different Signs: 1.  $-5 + 3 = -2$

2.  $-5 + 8 = 3$

3.  $8 - 12 = -4$

\*4.  $-5 - (-7) = -5 + (+7) = 2$

**\*Be careful** on these problems: 2 negatives in a row become plus a positive

### Multiply & Divide Examples:

[Khan Academy Search Topic: Multiply & Divide Integers](#)

2 Signs are the same = Positive

1.  $(-4)(-6) = 24$

2.  $(5)(8) = 40$

2 Signs are Different = Negative

1.  $(-2)(9) = -18$

2.  $(3)(-10) = -30$

**\* Be careful:** An odd number of negatives being multiplied = a negative answer!

3.  $(-3)(-4)(-2)$  Multiply the first 2 negative numbers and get a positive.

$(12)(-2)$  Now the signs are different so when you multiply  
 $-24$  the result is a negative answer



**Objective #3 . Use the notes from Objective # 3 to either add, subtract, multiply or divide integers.**

25)  $6 + (-1)$

- A) 3      B) 20  
C) 5      D) -2

26)  $(-12) + (-16)$

- A) -14      B) -28  
C) -21      D) -35

27)  $(-16) - 7$

- A) -11      B) -23  
C) -29      D) -9

28)  $16 - (-2)$

- A) 29      B) 5  
C) 18      D) 14

29)  $(-11) + 13$

- A) 4      B) -13  
C) 5      D) 2

30)  $(-7) - (-6)$

- A) 11      B) -13  
C) -11      D) -1

31)  $(7)(-10)$

- A) -70      B) -77  
C) -62      D) -69

32)  $(-6)(-10)$

- A) -9      B) 60  
C) -60      D) 9

33)  $-9 \cdot -10$

- A) -19      B) 90  
C) 85      D) -90

34)  $4 \cdot -8$

- A) -4      B) -30  
C) -34      D) -32

35)  $-4 \cdot -3 \cdot -4$

- A) -51      B) 48  
C) -48      D) -53

36)  $5 \cdot -2 \cdot -5$

- A) 72      B) 50  
C) -50      D) -72

37)  $72 \div -8$

- A) 64      B) 8  
C) -9      D) -10

38)  $-45 \div -5$

- A) -5      B) 9  
C) 3      D) -50

39)  $\frac{40}{8}$

- A) 5      B) 6  
C) -3      D) 3

40)  $\frac{48}{8}$

- A) 6      B) 56  
C) -6      D) -7

## OBJECTIVE 4: Order of Operations

[Khan Academy Search Topic: Order of Operations](#)

Order of Operations is important because it gives everyone a general rule as to how to proceed to simplify an expression. Without this rule, different answers can be produced.

Same problem done two different ways:	$12 - 2 \cdot 5$	$12 - 2 \cdot 5$
Which is right?	$12 - 10$ (Right)	$10 \cdot 5$ (Wrong)
	2	50

Remember: **PEMDAS** or **Please Excuse My Dear Aunt Sally**

<b>P:</b>	<b>Parenthesis</b> or any grouping symbol: $()$ , $[\ ]$ , $\_$ , $\ $ , $\sqrt{\quad}$
<b>E:</b>	<b>Exponents</b> - Simplify
<b>M &amp; D:</b>	<b>Multiply and Divide</b> - Simplify from left to right to decide which operation to perform first
<b>A &amp; S:</b>	<b>Addition and Subtraction</b> - Simplify from left to right to decide which operation to perform first

### Examples:

- |    |   |  |
|----|---|--|
| 1. | $5 + 2^3 \div 4 - 6$<br>$5 + 8 \div 4 - 6$<br>$5 + 2 - 6$<br>$7 - 6$<br>1             | No parenthesis, do exponent first.<br>Next division level<br>Next addition since it comes first from left to right.<br>Last Subtraction              |
| 2. | $37 + 3[16 \div (2 \cdot 4)]$<br>$37 + 3[16 \div 8]$<br>$37 + 3[2]$<br>$37 + 6$<br>42 | Parenthesis first, work with inner most set first.<br>Then complete last grouping<br>No exponents, so next is multiplication<br>Then addition        |
| 3. | $(3 + 2)^2$<br>$(5)^2$<br>25  | <b>Be careful here</b> – Parenthesis first! <b>Then</b> exponent!<br>A common mistake is to square first then add - <i>wrong!</i><br>Then calculate. |
| 4. | $4(3)^2 - 7 \cdot 2$<br>$4(9) - 7 \cdot 2$<br>$36 - 14$<br>22                         | <b>Again be careful here</b> – Exponent first!<br>Now 2 multiplications can be performed.<br>Last – subtraction.                                     |

**Objective #4 . Use the notes from Objective #4 to follow Order of Operations to evaluate the expression.**

41)  $5 \times 3 - 1$

- A) 14      B) 17  
C) 10      D) 12

42)  $(1 + 9) \div 5$

- A) 4      B) 6  
C) 8      D) 2

43)  $1 + 4 \cdot 5$

- A) 21      B) 18  
C) 25      D) 19

44)  $4 \div 4 + 6 \times 2$

- A) 14      B) 12  
C) 13      D) 11

45)  $(6 + 2) \times 2 - 5$

- A) 11      B) 10  
C) 17      D) 12

46)  $5 - (5 - 3)^2$

- A) -11      B) 5  
C) 7      D) 1

47)  $6 \times 4 \div (2 - 2 + 4)$

- A) 0      B) 12  
C) 11      D) 6

48)  $(18 \div (2 + 1) + 4) \times 4$

- A) 34      B) 40  
C) 45      D) 43

**OBJECTIVES 5 & 6: Evaluate expressions with exponents.**

*Khan Academy Search Topic: Intro to Exponents  
And Order of Operations with exponents*



*Be familiar with the terminology of exponents:*

$$2^3 \rightarrow 2 \cdot 2 \cdot 2 = 8$$

**Exponent:** 3  $\rightarrow$  tells how many times we must multiply 2 to itself.

**Base:** 2  $\rightarrow$  the number we must multiply to itself the requested number of times.

$2^3$ : Can be read ..... “2 to the third power” or “2 cubed”

**Be careful:** When you raise a negative number to an exponent... **parenthesis are important!**

$-2^4 = -16$  because you are only multiplying 2 to itself 4 times **NOT**  $-2$ .  
 $-2^4 = -1 \cdot 2^4 = -16$  (The negative is not included on the exponent)

**BUT**

$(-2)^4 = 16$  Because here the parenthesis indicate you are multiplying  $-2$  to itself 4 times.  
 $(-2)^4 = -2 \cdot -2 \cdot -2 \cdot -2 = 16$  (The negative is included on the exponent)

**Objective # 5 . Use the notes from Objective # 5 to evaluate the expression using exponents and order of operations.**

49)  $(15 - 8)^2 - (13 - 6)$

- A) 54      B) 46  
C) 42      D) 27

50)  $4^2 + 4 \times 8 + 11$

- A) 50      B) 51  
C) 59      D) 48

51)  $36 \div (1^2 + 9 - 6)$

- A) 21      B) 9  
C) 11      D) 18

52)  $1^2 + 13 - 2^2$

- A) 10      B) 16  
C) 3        D) 12

53)  $9^2 - (3 + 1) - 8$

- A) 69      B) 79  
C) 65      D) 59

54)  $6^2 - 5 + 3 - 5$

- A) 29      B) 42  
C) 26      D) 24

55)  $(39 - 3^2) \div 2$

- A) 18      B) 15  
C) 1        D) 29

56)  $11^2 - 14 - 7 \times 10$

- A) 37      B) 47  
C) 52      D) 38

**Objective # 6 . Use the notes from Objective # 6 to evaluate the expression using exponents.**

57)  $5^2$

- A) 25      B) -10  
C) -25     D) 10

58)  $(-3)^2$

- A) 6        B) -9  
C) -6      D) 9

59)  $4^3$

- A) -64     B) -12  
C) 64      D) 12

60)  $(-6)^3$

- A) 18      B) 216  
C) -216   D) -18

61)  $(-2)^4$

- A) 8        B) 16  
C) -16     D) -8

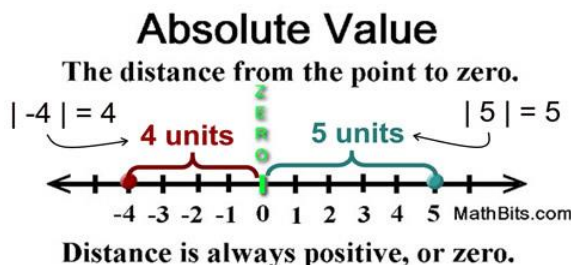
62)  $-3^4$

- A) -81     B) 12  
C) -12     D) 81

**OBJECTIVE 7: Absolute Value :  $|x|$** 

[Khan Academy Search Topic: Absolute Value](#)

**Absolute Value** is the distance a number is from 0 on the number line. And distance must ALWAYS be positive.



In simple terms, *the absolute value of any number is positive.*

If the number is positive, then it stays positive.

If the number is negative, then it becomes positive.

Examples:

1.  $|3| = 3$

2.  $|-3| = 3$

3.  $-|-3| = -3$      **Be careful here** because there is a negative on the outside waiting to change the sign once you find the absolute value.

It's like  $-1 \cdot |-3| = -1 \cdot 3 = -3$

4.  $-2|-7 + 5|$      **Be careful here too!** You can't distribute into an absolute value.

$-2|-2|$

Calculate what is inside the absolute value first

$-2 \cdot 2$

Then take the absolute Value

$-4$

Then calculate.

**Objective # 7 . Use the notes from Objective # 7 to evaluate the absolute value expression.**

63)  $|-18|$

- A) 18            B) 0  
C) None        D) -18

64)  $|21|$

- A) None        B) -21  
C) 0            D) 21

65)  $6|-8|$

- A) 48            B) -48  
C) 14            D) -2

66)  $4+|2-7|$

- A) -1            B) 5  
C) 13            D) 9

67)  $-5|2 \cdot 5 + 2|$

- A) -60            B) -70  
C) 60            D) 70

68)  $2|1-8| - |6-11+3|$

- A) -12            B) 12  
C) 16            D) 34

**OBJECTIVE 8: Evaluate algebraic expressions for given numeric values.**

*Khan Academy Search Topic: Evaluate an algebraic expression*

If asked to evaluate an expression for a given numeric value, you are just **substituting** into the variables their stated numeric value.

Evaluate  $5z - 3y + x^3y$  when  $x = -2$ ,  $y = 3$  and  $z = 1$

**HINT:** When substituting into variables, place ( ) first in place of the variable and then insert into the parenthesis the corresponding value:

$5(1) - 3(3) + (-2)^3(3)$  : ( ) are around all the numbers substituted in!

Now follow order of operations! Here these parentheses are only showing multiplication (not grouping) so we move to exponents.

$5(1) - 3(3) + (-8)(3)$

Now multiply.

$5 - 9 - 24$

Now subtract left to right.

$-4 - 24$

$-28$

**Objective # 8 . Use the notes from Objective # 8 to evaluate the expression by substituting in for the variables.**

69)  $5 - x - y$ ; use  $x = 2$ , and  $y = 1$

- A) 2      B) 3  
C) 1      D) 8

70)  $j + h^2$ ; use  $h = 4$ , and  $j = 1$

- A) 17      B) 13  
C) 11      D) 18

71)  $y + 6 - x + y$ ; use  $x = 6$ , and  $y = 4$

- A) 8      B) 7  
C) 2      D) 4

72)  $p + 5 - (q + p)$ ; use  $p = 5$ , and  $q = 2$

- A) 3      B) 2  
C) 0      D) 5

73)  $y - (x - x)^2$ ; use  $x = 4$ , and  $y = 5$

- A) 0      B) 6  
C) 3      D) 5

74)  $25y + z$ ; use  $y = 2$ , and  $z = 1$

- A) 54      B) 52  
C) 57      D) 51

75)  $\frac{b - (a - b)^2}{4}$ ; use  $a = 6$ , and  $b = 5$

- A) 1      B) 0  
C) 6      D) 3

76)  $(x - x)(y + x) + 4$ ; use  $x = 3$ , and  $y = 5$

- A) 10      B) 4  
C) 6      D) 5

## OBJECTIVE 9: Convert Word Phrases to Mathematical Expressions.

[Khan Academy Search Topic: Writing Expressions with variables](#)

**Expression:** A mathematical phrase made up of variables and/or numbers and operations.

Examples of expressions:    a.  $6n - 4$   
     b.  $10 + x^2 - 2y$

**When converting Verbal Expressions to Algebraic Expressions, we can (for the most part) write the expression mathematically in the order we are reading it (*direct translation*).**

To do this it is important to remember the KEY words that represent the 4 Basic Math Operations:

Addition Words		
Word	Verbal Expression	Written Expression
Plus	Five plus a number	$5 + x$
Increased by	Six increased by a number	$6 + x$
More than	A number more than 12	$12 + x$
Sum	The sum of 10 and a number	$10 + x$

Subtraction Words		
Word	Verbal Expression	Written Expression
Minus	Five minus a number	$5 - x$
Decreased by	Six decreased by a number	$6 - x$
**Less than (change order)	A number less than 10	$10 - x$
Difference	The difference of 8 and a number	$8 - x$

Multiplication Words		
Word	Verbal Expression	Written Expression
Times	A letter times 5	$5x$
Product	The product of a number and 8	$8x$
twice	Twice a number	$2x$

Division Words		
Word	Verbal Expression	Written Expression
Quotient	The quotient of $x$ and 10	$x \div 10$ or $\frac{x}{10}$
Divided by	Ten divided by a number	$10 \div x$ or $\frac{10}{x}$
Half of	Half of a number	$x \div 2$ or $\frac{x}{2}$

### Additional Information

A number:	$x$ or $n$ or any variable
The square of a number	$x^2$
The cube of a number	$x^3$



**Objective # 9 . Use the notes from Objective # 9 to choose the math expression from a verb expression or the verbal expression from the math expression.**

77) 19 less than x

- A)  $2x$             B)  $19x$   
 C)  $x - 19$         D)  $19 - x$

79) 5 cubed

- A)  $c^3$             B)  $c^3 \leq 7$   
 C)  $5^3$             D)  $5 - c$

81) the sum of 8 and 12

- A)  $8 + 12$         B)  $12 - 8$   
 C)  $8 \cdot 12$         D)  $8^2$

83) the quotient of n and 5

- A)  $\frac{5}{n}$             B)  $n - 5$   
 C)  $n^2$             D)  $\frac{n}{5}$

85)  $11 + u$

- A) the product of 11 and u  
 B) the sum of 11 and u  
 C) twice u  
 D) 11 decreased by u

87)  $x - 14$

- A) x to the 14th  
 B) the quotient of x and 14  
 C) the difference of x and 14  
 D) twice x

78) k squared

- A)  $2^2$             B)  $k - 2$   
 C)  $2 - k > 32$     D)  $k^2$

80) 17 decreased by 14

- A)  $14 - 17$         B)  $\frac{17}{14} = 6$   
 C)  $17 + 14 > 16$     D)  $17 - 14$

82) the product of 10 and 11

- A)  $10^{11}$             B)  $10 \cdot 11$   
 C)  $\frac{11}{10} > 42$         D)  $10 - 11$

84) 8 more than a

- A)  $2a \leq 9$         B)  $8 - a$   
 C)  $\frac{8}{a}$             D)  $a + 8$

86)  $5n$

- A) the product of n and 5  
 B) half of 5  
 C) the sum of n and 5  
 D) n less than 5

88)  $\frac{n}{8}$

- A) the sum of n and 8  
 B) the quotient of 8 and n  
 C) 8 cubed  
 D) the quotient of n and 8

**OBJECTIVE 10: Solve 1 and 2 step equations.**

***GOAL: Isolate the variable. To do this, you must perform the opposite operation that is being done on the variable to both sides of the equation. When the variable is isolated, the equation is solved!***

**Solving One Step Equations:**

*[Khan Academy Search Topic: One Step Equations review](#)*

1. Identify the term with the variable and determine the operation on the variable.
2. Perform the inverse operation to BOTH SIDES of the equation to isolate the variable.

**Examples:** Solve the following:

a. 
$$\begin{array}{r} -3 + x = -7 \\ +3 \quad +3 \\ \hline x = -4 \end{array}$$
-3 is being added to  $x$ , the opposite of  $-3$  is  $+3$   
Therefore we will  $+3$  to both sides  
The 3's cancel on the right and  $x$  is isolated: **Done!**

b. 
$$\begin{array}{r} \frac{m}{7} = -4 \\ \cdot 7 \cdot \frac{m}{7} = -4 \cdot 7 \\ \hline m = -28 \end{array}$$
 $m$  is being divided by 7, the opposite is to multiply by 7  
Multiply 7 to both sides.  
7's cancel on the right and  $x$  is isolated: **Done!**

c. 
$$\begin{array}{r} 6x = -12 \\ \frac{6x}{6} = \frac{-12}{6} \\ \hline x = -2 \end{array}$$
 $x$  is being multiplied by 6, the opposite is to divide by 6  
Divide both sides by 6  
6's cancel on the right and  $x$  is isolated: **Done!**

**Solving Two Step Equations**

[Khan Academy Search Topic: Two Step Equations review](#)

1. Identify the term with the variable and determine the side it is on.
2. First isolate the term with the variable by getting rid of the other term on the same side as it. How? By doing the inverse operation of Adding or Subtracting it to both sides of the equation. (**Always Add/Subtract first**)
3. Then isolate the variable by doing the inverse operation of Multiplication or Division to both sides of the equation. (**Always do Multiply/Divide second**)

**Examples:** Solve the following:

d. 
$$\begin{array}{r} 5x + 3 = -18 \\ +3 \quad +3 \\ \hline 5x = -15 \\ \frac{5x}{5} = \frac{-15}{5} \\ x = -3 \end{array}$$

This has 2 operations: Multiply by 5, subtract 3. **Take care of add/subtract first!** Therefore ADD 3 to both sides.

Then divide by 5 to both sides!

$x$  is isolated: **Done!**

e. 
$$\begin{array}{r} \frac{x}{3} + 7 = -1 \\ -7 \quad -7 \\ \hline \frac{x}{3} = -8 \\ 3 \cdot \frac{x}{3} = -8 \cdot 3 \\ x = -24 \end{array}$$

This has 2 operations: Divide by 3, add 7. **Take care of add / subtract first!** Therefore subtract 7 to both sides.

Then multiply both sides by 3!

$x$  is isolated: **Done!**

**Objective # 10 . Use the notes from Objective # 10 to solve each equation.**

89)  $20 + m = 29$

- A) {580}      B)  $\left\{1\frac{9}{20}\right\}$   
C) {9}        D) {49}

91)  $\frac{x}{4} = -8$

- A) {-2}        B) {-4}  
C) {-12}      D) {-32}

93)  $v + 4 = -16$

- A) {-64}      B) {-12}  
C) {-4}        D) {-20}

95)  $7x - 4 = 73$

- A) {-9}        B) {11}  
C) {-18}      D) {-10}

97)  $9 + 10x = 9$

- A) {9}         B) {3}  
C) {0}         D) {-7}

99)  $\frac{k}{4} + 3 = -1$

- A) {6}         B) {-18}  
C) {-16}      D) {15}

90)  $-11 = r - 8$

- A)  $\left\{-1\frac{3}{8}\right\}$       B) {-19}  
C) {-3}        D) {-88}

92)  $-10n = 20$

- A) {10}        B) {-200}  
C) {30}        D) {-2}

94)  $13 - x = 24$

- A) {11}        B) {-11}  
C) {37}        D)  $\left\{1\frac{11}{13}\right\}$

96)  $-4 = -7 + \frac{n}{5}$

- A) {-6}        B) {15}  
C) {1}         D) {18}

98)  $2 + \frac{x}{9} = 1$

- A) {-20}      B) {-9}  
C) {2}         D) {16}

100)  $135 = -9x + 9$

- A) {1}         B) {2}  
C) {5}         D) {-14}