

Name _____

Date _____

Module #1:**Worksheet 3c:****Variables** **View Tutorial 3c**

✦ **Objective:** Translate a verbal phrase into an algebraic expression, write a verbal phrase to describe an algebraic expression.

Variables and Expressions

Any letter used to represent an unknown number is called a *variable*. Variables can be used to translate verbal phrases into algebraic expressions.

Words	Symbols
4 more than a number	$x + 4$
a number decreased by 8	$b - 8$
the product of 5 and a number	$5c$ (No symbol between a number and a variable means to multiply)
a number divided by 8	$h \div 8$ or $\frac{h}{8}$
a number squared	y^2

Write a verbal expression for each algebraic expression:

1. $w - 1$ _____ 2. $\frac{1}{3}a^3$ _____ 3. $81 + 2x$ _____

Write an algebraic expression for each verbal expression:

Use n as the variable.

4. a number decreased by 5 _____ 5. four times a number _____
6. 8 less than a number _____ 7. a number divided by 6 _____
8. a number multiplied by 37 _____ 9. the sum of a number and 9 _____
10. 3 less than 5 times a number _____ 11. twice the sum of 15 and a number _____
12. 7 more than the product of 6 and a number _____ 13. 30 increased by 3 times a number _____

Module #1:
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Variables

Reading Algebra: Translating Words into Symbols

Although the expression *7 less than x* and the statement *7 is less than x* look similar, their meanings are very different. The phrase *less than* indicates subtraction; whereas the phrase *is less than*, indicates the relationship between two unequal numbers. The symbol $<$ represents this inequality.

<u>Words</u>	<u>Symbols</u>
Seven less than x	$x - 7$
Seven is less than x	$7 < x$

The expressions $x - 7$ and $7 - x$ also have different meanings. In the expression $x - 7$, 7 is subtracted from x . So the value of $x - 7$ is 7 less than the value of x . But in the expression $7 - x$, x is subtracted from 7. Therefore, the value of $7 - x$ is equal to 7 decreased by the value of x .

<u>Symbols</u>	<u>Words</u>
$x - 7$	seven less than x
$7 - x$	seven less x , or seven decreased by x

The phrases *greater than* and *is greater than* have different meanings and are also represented by different symbols. We use a plus sign to indicate *greater than*, and we use the inequality symbol, $>$, to indicate *is greater than*.

<u>Words</u>	<u>Symbols</u>
ten more than the quantity m minus n	$(m - n) + 10$
ten increased by the quantity $m - n$	$10 + (m - n)$
The quantity m minus n is greater than ten.	$m - n > 10$

Write each expression in symbols:

- 14. Three greater than twice a number x . _____
- 15. Five is less than the cube of a . _____
- 16. Three times x is greater than nine less than x . _____
- 17. Five times the quantity of a plus b . _____

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**Module #1:
Worksheet 3c:****Variables****Write each algebraic expression in words:**

18. $4m - 1$

19. $3(b - 2) + 6$

20. $a^2 + (a + 5)$

21. $y > 5$

22. $8x - 3 < 3$

23. $y > 4x + 3$

Simplifying by combining “like terms”:

- Terms are *like terms* if they meet two criteria:
 - ❶ The terms must have the same variable(s).
 - ❷ The variable(s) must have the same exponents on them.
- $4x$ and $11x^2$ are not like terms. They do not have the same exponent.
- $5x$ and $7x$ are like terms. They meet both criteria above.

Examples:**Like Terms**

$2x + 3x$

$7y^2 - 3y^2$

$-6t + 4t$

$0.5m + 4.5m$

$-3x + -5x + 10x$

$4n^2 + 5n^3$

$5x - 3$

Combined

$5x$

$4y^2$

$-2t$

$5.0m$

$2x$

$4n^2 + 5n^3$ (They are not “like” terms, they do not have the same exponents)

$5x - 3$ (They are not “like terms”, no “x” on 3)

Simplify, if possible:

24. $2n + 7n$ _____

25. $12x + 12x$ _____

26. $5a + 2$ _____

27. $12b^3 - 7b^3$ _____

28. $-3a - (-7a)$ _____

29. $m - 4 + 13$ _____