

## Study Guide and Notes: Variables and Expressions

A variable is a symbol, usually a letter, used to represent an unspecified number. It is used in to “translate” verbal expressions into algebraic expressions or formulae. Math symbols are used to indicate what type of computation to do. Here are some examples of expressions using mathematical operations and variables:

Addition:

4 plus a number	$4 + x$
5 more than a number	$x + 5$
A number increased by 3	$x + 3$
The sum of a number and 2	$x + 2$



Subtraction:

The difference of $a$ and $b$	$a - b$
3 less than a number	$x - 3$
A number decreased by 8	$x - 8$
A number less 6	$x - 6$

Multiplication:

The product of $a$ and $b$	$ab$
5 times a number	$5x$
Twice a number	$2x$

Division:

The quotient of $a$ and $b$	$a \div b$
A number divided by 8	$x \div 8$
The ratio of $x$ and $y$	$x \div y$

Exponents:

The square of a number	$x^2$
The cube of a number	$x^3$
A number raised to the 5 <sup>th</sup> power	$x^5$

Write a variable expression the the algebraic expression.

1.  $3x + 7$

2.  $x - 9$

3.  $x^2 - 2x$

4.  $\frac{a}{2b}$

*7 more than the product of 3 and  $x$*

*9 less than a number*

*the square of a number decreased by twice th enumber*

*the quotient of  $a$  and twice  $b$*

Write an algebraic expression for the variable expression.

5. twice a number increased by 5  
 $2x + 5$

6. the sum of a number and 6  
 $x + 6$

7. the quotient of 8 and  $x$   
 $8 \div x$

8. 9 less than a number  
 $x - 9$

9. the square of a number decreased by 3  
 $x^2 - 3$

10. the difference of  $x$  and  $x$  squared  
 $x - x^2$

Note the similarities and the differences in the following expressions

11. the sum of twice  $x$  and  $y$   
 $2x + y$

12. twice the sum of  $x$  and  $y$   
 $2(x + y)$

13. 4 times the difference of  $a$  and  $b$   
 $4(a - b)$

14. the difference of 4 times  $a$  and  $b$   
 $4a - b$

Write the expression using exponents.

15. 9 to the third power  $9^3$

16.  $8 \cdot 8 \cdot 8 \cdot 8$

$8^4$

17.  $5 \cdot b \cdot b \cdot c \cdot c \cdot c$   $3b^2c^3$

Evaluate the expression. Use the calculator keystrokes shown to check your work after you work the problem.

18.  $3^4$  81

**3** **^** **4** **EXE**

19.  $5^3$  125

**5** **^** **3** **EXE**

20.  $10^7$  10,000,000

**1** **0** **^** **7** **EXE** or  
**SHIFT** **log** **7** **EXE**