

Unit 1(Part 2) Patterns &amp; Relations

Variables, Constants & Coefficients

★ A constant is value that never changes. (A Number )

#  
Alone

Ex) There will always be 7 days in a week,

★ A variable is a value that changes. (Letter)

Ex 1) The number of students present in grade 7 class can change from day to day, or

Ex 2) the number of days it rains in one week changes.

- a letter that represent the unknown value

Ex 1) Let  $p$  represents the number of students absent from school today.

Ex 2) Let  $a$  represent the teacher's age.

★ A coefficient is a number in front of the variable  
represents repeated addition

> multiplied  
by letter

Repeated Addition is when you write the variable being added to itself.

Example)  $3c = c + c + c$

$$5w = w + w + w + w + w$$

Often we translate phrases into expressions in math.

Ex)  $2x + 7$

★ Algebraic expression contains a variable and an operation.

↳ has no equal sign

There are certain words that we associate with the different operations:

Addition	Subtraction	Multiplication	Division
sum	difference	product	quotient
plus	minus	times $\rightarrow$ (times) 2	divided by
increased by	decreased by	double, twice	half $(\div 2)$
more than	reduced by	of	third $(\div 3)$
.		triple (time by) 3	

When using variables, you do not always have to include the times sign, it is assumed to be there.

Ex 1)  $6n$  means  $6 \times n$

Ex 2)  $12t$  means  $12 \times t$ .

You can simply write the number followed by the variable. (Note: you can not write the variable first, without the times sign. You can not write  $b4$ , it has to be written as  $4b$  or  $b \times 4$ ).

EX) In the expression  $8m + 3$ ,

- 8 is the coefficient of the variable
- 3 is the constant term
- m is the variable

Ex1)  $3x+2$

Coefficient: 3Variable: xConstant: 2

# in front of letter  
# alone

Ex 2)  
 $v - 7$

Coefficient: 1Variable: vConstant: 7

↑ understood 1  
1v-7 in front of letter

You try

let  $n \equiv$  a number

Always state what your variable represents

1. Translate the following into expressions:

(a) a number increased by 8

$$\underbrace{n} + 8$$

(b) a number reduced by 21

$$n - 21$$

(c) the product of a number and 9

$$n \times 9 \quad \text{or} \quad 9n$$

 ~~$n \times 9$~~ 

(d) twice a number increased by 3

$$\underbrace{2n} + 3$$

2. Write the following algebraic expressions as words:

(a)  $3 + v$  → 3 plus a number(b)  $8r$  → 8 times a number

eight times a number

(Product of 8 and a number)

(c)  $t - 9$  a number reduced by 9 (9 less than a number)(d)  $y / 8$ 

a number divide by 8

(a number shared among 8)

1. Translate the following into expressions:

- (a) a number increased by 8
- (b) a number reduced by 21
- (c) the product of a number and 9
- (d) twice a number increased by 3

Solutions

2. Write the following algebraic expressions as words:

- (a)  $3 + v$
- (b)  $8r$
- (c)  $t - 9$
- (d)  $y / 8$

1a)  $b = \text{the number}$   
 $b + 8$

b)  $c = \text{the number}$   
 $c - 21$

c)  $d = \text{the number}$   
 $9 \times d$  or  $9d$

d)  $y = \text{the number}$   
 $2 \times y + 3$   
 or  $2y + 3$

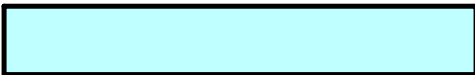
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2a) a number increased by 3

b)  $8r \rightarrow$  8 times the amount of money

c)  $t - 9 \rightarrow$  the number of marbles decreased by 9.

d)  $\frac{y}{8} \rightarrow$  amount of rainfall divided by 8.



# Class/Homework



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#1(a,b,c)

#2

#3(a,b,c,d)

#4(a,b)

#5(a,b,c,d,e) define your variable

let  $n =$

#6(a)

	Coeff	Cons	Var
1) $a) 3x+2$			
$b) 5n$			
$c) wt+3$			

5a) Double a number add 3  
 $2n + 3$

5b) Subtract 5 from a number  
 $n - 5$   
 (Note:  $2n+3$  is boxed in green above 'from', and 'comes first' is written in red below 'from' with a red bracket pointing to the '5'.)