

TRANSLATE WORD SENTENCES INTO ALGEBRAIC EXPRESSIONS

The following table lists the most common phrases and their translation.

Operation	Words	Example of Phrase	Algebraic Sign	Algebraic Translation
Addition	sum plus added more than increased by	the sum of a number and 2 two plus a number two added to a number two more than a number a number increased by 2	+	$x + 2$
Subtraction	difference minus subtracted from less than decreased by reduced by deducted from	the difference of a number and two a number minus 2 two subtracted from a number two less than a number a number decreased by two a number reduced by two two deducted from a number	-	$x - 2$
Multiplication	product of multiply times twice thrice	the product of a number and two a number multiplied by two two times a number twice a number thrice a number	·	$2x$ $3x$
Division	quotient of divided by	the quotient of a number and two a number divided by two	÷	$\frac{x}{2}$
Equal	equal to result is is		=	

EXAMPLES:

Translate each of the following into an algebraic expression.

- 1) Twelve more than five times a number. $5x + 12$
- 2) Six times the sum of a number and four. $6(x + 4)$
- 3) Eight subtracted from two times a number. $2x - 8$
- 4) The quotient of one less than a number and twice a number. $\frac{x - 1}{2x}$
- 5) The sum of a number and its reciprocal is equal to four. $x + \frac{1}{x} = 4$

6) Eleven times the difference of a number and three is equal to twice the number. $5(x - 3) = 2x$

7) The product of a number and four increased by the number. $4x + x$

8) Five less than six times a number divided by twice the number. $\frac{6x - 5}{2x}$

9) The product of two numbers, if one number is one less than twice the other number. $x(2x - 1)$

10) If seven times a number is reduced by nine, the result is ten less than the number. $7x - 9 = x - 10$

11) The product of the sum and difference of two numbers. $(x + y)(x - y)$

12) The sum of three consecutive integers is 126. $x + (x + 1) + (x + 2) = 126$
let x represent the first integer
 $x + 1$ will represent the second integer,
 $x + 2$ will represent the third integer

(The above can be thought of in the following way: an example of 3 consecutive integers would be 5,6,7. If 5 is the first integer, then what operation do you do to get to the next number - add one)

13) The sum of three consecutive odd integers is 123. $x + (x + 2) + (x + 4) = 123$
let x represent the first integer
 $x + 2$ will represent the second integer,
 $x + 4$ will represent the third integer

(The above can be thought of in the following way: an example of 3 consecutive odd integers would be 5,7,9. If 5 is the first integer, then what operation do you do to get to the next number - add two)

14) The sum of three consecutive even integers is 384. $x + (x + 2) + (x + 4) = 384$
let x represent the first integer
 $x + 2$ will represent the second integer,
 $x + 4$ will represent the third integer

(The above can be thought of in the following way: an example of 3 consecutive even integers would be 4,6,8. If 4 is the first integer, then what operation do you do to get to the next number - add two)

Note: the set up is the same for both consecutive odd and consecutive even integers because for both cases you add two to get to the next number.

EXAMPLES:

Translate and simplify the expression.

- 1) Add half the quantity, $12x - 8y + 16$, to the quantity, $3x + 1$.

$$\frac{1}{2}(12x - 8y + 16) + (3x + 1) \quad \text{translation}$$

$$6x - 4y + 8 + 3x + 1$$

$$9x - 4y + 9 \quad \text{simplified expression}$$

- 2) Subtract the quantity, $x^2 - 2x + 3$, from the quantity, $4 - 5x + 7x^2$.

$$(4 - 5x + 7x^2) - (x^2 - 2x + 3) \quad \text{translation}$$

$$4 - 5x + 7x^2 - x^2 + 2x - 3$$

$$1 - 3x + 6x^2 \quad \text{simplified expression}$$

- 3) Subtract six times the quantity, $3a - 5b + 7c$, from two-thirds the quantity, $9a - b - 6c$.

$$\frac{2}{3}(9a - b - 6c) - 6(3a - 5b + 7c) \quad \text{translation}$$

$$6a - \frac{2}{3}b - 4c - 18a + 30b - 42c$$

$$-12a + \frac{88}{3}b - 46c \quad \text{simplified expression}$$

- 4) Two times the sum of the quantities, $3 - 12y - 4y^2$ and $7y^2 - 12y - 5$, minus the quantity, $14 - 15y + 17y^2$.

$$2(3 - 12y - 4y^2 + 7y^2 - 12y - 5) - (14 - 15y + 17y^2) \quad \text{translation}$$

$$6 - 24y - 8y^2 + 14y^2 - 24y - 10 - 14 + 15y - 17y^2$$

$$-18 - 33y - 11y^2 \quad \text{simplified expression}$$

- 5) Subtract three times the quantity, $x - 2xy + 3y$, from twice the sum of the quantities, $5x - 7xy + 2y$ and $4xy - 9y + 3x$.

$$2(5x - 7xy + 2y + 4xy - 9y + 3x) - 3(x - 2xy + 3y) \quad \text{translation}$$

$$2(8x - 3xy - 7y) - 3(x - 2xy + 3y)$$

$$16x - 6xy - 14y - 3x + 6xy - 9y$$

$$13x - 23y \quad \text{simplified expression}$$