

1–4 Translating Words into Symbols

Objective: To translate phrases into variable expressions.

	Phrase	Variable Expression
<i>Addition</i>	The <i>sum</i> of 6 and x	$6 + x$
	A number <i>increased</i> by 5	$n + 5$
	3 <i>more than</i> a number	$n + 3$
<i>Subtraction</i>	The <i>difference</i> between a number and 7	$x - 7$
	A number <i>decreased</i> by 6	$x - 6$
	3 <i>less than</i> a number	$n - 3$
	9 <i>minus</i> a number	$9 - n$
<i>Multiplication</i>	The <i>product</i> of 6 and a number	$6n$
	Five <i>times</i> a number	$5n$
	One half <i>of</i> a number	$\frac{1}{2}x$
<i>Division</i>	The <i>quotient</i> of a number and 4	$\frac{n}{4}$
	A number <i>divided</i> by 8	$\frac{n}{8}$

CAUTION The phrase “6 less than x ” is translated $x - 6$ and *not* $6 - x$.
The phrase “6 more than x ” can be translated as either $6 + x$ or $x + 6$.

Example 1 Translate each phrase into a variable expression.

a. Five less than half of x

b. One half the difference between x and 5

Solution a. Half of x : $\frac{1}{2}x$
Five less than half of x : $\frac{1}{2}x - 5$

b. The difference between x and 5: $(x - 5)$
One half the difference between x and 5: $\frac{1}{2}(x - 5)$

Translate each phrase into a variable expression. Use n for the variable.

- Five more than a number
- The product of 7 and a number
- A number divided by 4
- Seven less than a number
- The sum of 3 and a number
- A number decreased by 8
- The quotient of a number and 3
- The difference between a number and 6
- Nine times a number
- The difference between 9 and a number
- Four more than half a number
- Two less than 4 times a number
- Ten less than one half a number
- The quotient of 3 and a number
- Three plus the product of a number and 5
- The difference between 3 times a number and 6
- Four more than three times a number
- Nine increased by twice a number
- Eight times the sum of a number and 2
- Seven times the difference of a number and 5

1-5 Translating Sentences into Equations

Objective: To translate word sentences into equations.

Example 1 Twice the sum of a number and 3 is twelve.

Translation $2 \cdot (n + 3) = 12$

Example 2 The sum of one half of the number x and 10 is 24.

Translation $\frac{1}{2}x + 10 = 24$

Match the sentence in the first column with the corresponding equation in the second column.

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|---|-------------------|
| 1. Three more than twice a number is nine. | a. $2 - 3x = 9$ |
| 2. Two less than three times a number is nine. | b. $3(x - 2) = 9$ |
| 3. Three times the number which is two less than x is nine. | c. $2x + 3 = 9$ |
| 4. Two times the number which is three less than x is nine. | d. $2(x + 3) = 9$ |
| 5. Two times the quantity three more than x is nine. | e. $3(2 - x) = 9$ |
| 6. Three less than the product of two and x is nine. | f. $2(x - 3) = 9$ |
| 7. Two decreased by three times a number is nine. | g. $2x - 3 = 9$ |
| 8. Three times the quantity two decreased by x is nine. | h. $3x - 2 = 9$ |

Translate each sentence into an equation.

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|---|---|
| 9. One half of a number is four. | 10. Three more than a number is eight. |
| 11. Six less than a number is nine. | 12. Two less than three times a number is eleven. |
| 13. Twice a number is 12 more than five times the number. | 14. The number x is seven more than one fourth of itself. |
| 15. Five less than twice a number is 15. | 16. Two times the quantity x minus 1 is 12. |
| 17. Eleven more than twice x is five less than x . | 18. Nine times x is twice the sum of x and five. |

Vocabulary

Formulas Equations that state rules about relationships. Examples:

$A = lw$ **Area of rectangle** = length of rectangle \times width of rectangle

$P = 2l + 2w$ **Perimeter of rectangle** = $(2 \times \text{length}) + (2 \times \text{width})$

$D = rt$ **Distance traveled** = rate \times time traveled

$C = np$ **Cost** = number of items \times price per item