

Variables, Expressions & Equations

A variable is used to express the unknown; we usually use the letter x .

An expression is a collection of numbers, variables and operation symbols [for example $+$, $-$]

example 1: Evaluate the expression

$$x + 4 \quad \text{when } x = 9$$

Here we replace x with 9 and simplify

↳ $x + 4 \rightarrow 9 + 4 = \underline{\quad}$

An equation is a statement that two variable expressions are equal.

example 2:

a) $x + 2 = 5$ is an equation.

Translated into words, it states that the quantity $x + 2$ is the same as 5, and asks what

↳ number do you add 2 to,

page 1 of 5 to get 5? answer: $x = \underline{\quad}$

example 3: Translate $14 - x = 10$
into a word statement and
then solve for x .

translation: what number do you
subtract from 14 to get 10?

↳ answer: $x = \underline{\quad}$

example 4: Evaluate $x + 9$ for
the given values of x .

a) $x = 6$

if $x = 6$, then $x + 9$ becomes
 $6 + 9 = 15$

b) $x = 2$

↳ answer: $\underline{\quad}$

c) $x = 10$

↳ answer: $\underline{\quad}$

example 5: Evaluate

$$\frac{6x + y^2}{5x + 4y} \quad \text{for } x=2, y=1$$

To evaluate this expression, we replace x with 2 and y with 1, then simplify.

$$\begin{aligned} & \frac{6(2) + (1)^2}{5(2) + 4(1)} \\ = & \frac{6(2) + 1}{5(2) + 4(1)} && \text{exponents first} \\ = & \frac{12 + 1}{10 + 4} && \text{then multiplication} \\ = & \frac{13}{14} && \text{note: always check} \\ & && \text{to see if the} \\ & && \text{fraction can be} \\ & && \text{reduced.} \end{aligned}$$

example 6: Is $x=4$ a solution to the equation $3-x=1$?

First we replace x with 4, then simplify. Then determine if the equation is true.

$$3 - x = 1$$

$$3 - 4 = 1 \quad ? \quad \text{replace } x \text{ with } 4$$

$$-1 = 1 \quad ? \quad \text{simplify}$$

Is this true?

NO, therefore $x=4$ is not
a solution to $3-x=1$

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Practice Problems

1. Evaluate $x+7$ for $x=9$

2. Evaluate $\frac{x+2y}{x^2+y}$ for $x=3, y=1$

3. Is $x=3$ a solution to the equation $2x^2-1=35$?