

Evaluating Algebraic Expressions

An expression is an algebraic expression if it contains sums and/or products of variables and numbers. To evaluate an algebraic expression, replace the variable or variables with known values, and then use the order of operations.

Order of Operations	
Step 1	Evaluate expressions inside grouping symbols.
Step 2	Evaluate all powers.
Step 3	Do all multiplications and/or divisions from left to right.
Step 4	Do all additions and/or subtractions from left to right.

EXAMPLE

1 Evaluate each expression.

a. $x - 5 + y$ if $x = 15$ and $y = -7$

$$\begin{aligned}x - 5 + y &= 15 - 5 + (-7) && \text{Substitute.} \\ &= 10 + (-7) && \text{Subtract.} \\ &= 3 && \text{Add.}\end{aligned}$$

b. $6ab^2$ if $a = -3$ and $b = 3$

$$\begin{aligned}6ab^2 &= 6(-3)(3)^2 && \text{Substitute.} \\ &= 6(-3)(9) && 3^2 = 9 \\ &= (-18)(9) && \text{Multiply.} \\ &= -162 && \text{Multiply.}\end{aligned}$$

EXAMPLE

2 Evaluate if $m = -2$, $n = -4$, and $p = 5$.

a. $\frac{2m + n}{p - 3}$

$$\begin{aligned}\frac{2m + n}{p - 3} &= \frac{2(-2) + (-4)}{5 - 3} && \text{Substitute.} \\ &= \frac{-4 - 4}{5 - 3} && \text{Multiply.} \\ &= \frac{-8}{2} \text{ or } -4 && \text{Subtract.}\end{aligned}$$

b. $-3(m^2 + 2n)$

$$\begin{aligned}-3(m^2 + 2n) &= -3[(-2)^2 + 2(-4)] \\ &= -3[4 + (-8)] \\ &= -3(-4) \text{ or } 12\end{aligned}$$

EXAMPLE

3 Evaluate $3|a - b| + 2|c - 5|$ if $a = -2$, $b = -4$, and $c = 3$.

$$\begin{aligned}3|a - b| + 2|c - 5| &= 3|-2 - (-4)| + 2|3 - 5| && \text{Substitute for } a, b, \text{ and } c. \\ &= 3|2| + 2|-2| && \text{Simplify.} \\ &= 3(2) + 2(2) && \text{Find absolute values.} \\ &= 10 && \text{Simplify.}\end{aligned}$$