

3-1-1 Evaluating Expressions

$$\begin{aligned}
 & (X)^2 + 8 \\
 & (5)^2 + 8 \\
 & = 25 + 8 \\
 & = 33
 \end{aligned}$$

An expression is variables and operations. Equations have equal signs. An expression can be simplified and evaluated for given values.

To evaluate the expression x^2+8 for $x= 5$,
Write the expression, replacing the variable with the known value.
Simplify. Be careful with the order of operations.

Notice the 5 is squared first. The result is added to 8.

Putting parenthesis where the variable is to be filled in is a good idea.

This isn't always necessary, but until you have had enough practice with negative numbers to know when parenthesis are needed and when they are not, always write them in.

Example: Evaluate $x^2 - y^2$ for $x= -4$ and $y = -5$
First, copy the pattern the expression makes. $()^2 - ()^2$
Then fill in the spaces with the given values. $(-4)^2 - (-5)^2$
Simplify, exponents before subtraction. $16 - 25 = -9$

Work the same problem
for $x=1$ and $y=-4$
 $(1)^2 - (-4)^2$
 $1 - 16 = -15$

The mistakes made are usually in following the order of operations or operations with negative numbers. Review rules as necessary and write all steps.

Example: $z-2x+y^2$ for $x=-2, z=-3, y=- 4$
 $()-2()+()^2$
 $(-3)-2(-2)+ (- 4)^2$
 $(-3)-2(-2)+16$
 $(-3)+4+16$
 $1+ 16 = 17$

Try the same formula for $x=-1, y=3$
and $z= -2$

$$()-2()+()^2$$

Practice: Write all steps. Each question will have two answers, one for each set of variable values.

Evaluate the following for $a=-1, b = 3$ Then try the same formulas with $a=5$ and $b=2$

a) $a+3b$ $(b-a)^2$ $ab-b$ a^2+b^2

Evaluate the following for $x=5, y = - 3, z= -15$ Second set : $x=-2, y=3, z=-1$

b) $\frac{x-y}{z-y}$ $\frac{y^2-x^2}{(x-y)}$ $\frac{\sqrt{y-z}}{2z}$ $\frac{y^2}{z-x}$

Evaluate the following for $w=1/2, r=-3/4, \text{ and } s=-1/3$ Second set: $w= 2/3, r= 1/2, s=-1$

c) $wr-s$ $sr-w$ $2w^2-r^2$ $(w-s)^2+8r$

Evaluate the following for $m=3, n=2.5, t=-2$ Second set: $m=-4, n=-1, t=-2$

d) $t^m - n(4m+t)$ $m^3-m(n-t)$ $tn - n^m$ $8 - 5mnt$

Evaluate the following for $x=5, y=-2, z=-1$ Second set: $x=2, y=3, z=-5$

e) $x-y(3-z)$ $xyz-y^2$ $xy+(x^2+y^2)$ $z-y-x$