

6.EE Introducing Equivalent Expressions 2

Alignments to Content Standards: 6.EE.A

Task

- A numeric expression like $5 + (8 + 2)^2$ has one and only one value. What is it?
- Consider the expression $5 + (x + 2)^2$. What are some values it can have? Make sure you organize your work, so anyone can tell which value for the expression goes with which x value.
- How many different values can an algebraic expression like $5 + (x + 2)^2$ have?
- What is the difference between the expression $2x$ when it is all by itself and when it is in an equation like $2x = 12$?

IM Commentary

The purpose of this series of two tasks (the previous one is [here](#)) is to highlight that while a numerical expression can only take one value, an algebraic expression can take many different values depending on the value of the variable. Furthermore, once you place that expression in a equation, it's possible that there can only be one value for the variable that makes the equation true. (It's also possible that the equation can be always true, as in $2x \div 3 = \frac{2}{3} \cdot x$, or never true, as in $x = x + 8$, but this task doesn't get into that idea.) All work is done out of a context with positive whole numbers, so that discussion can focus on the shift from numerical to algebraic expressions.

In parts (a) and (b), students new to working with exponents may need some help

evaluating the expressions correctly. They should know to "do the parentheses first" from previous grades, but may need reminding that by convention we evaluate exponents before we add.

[Edit this solution](#)

Solution

a. 105

b. Answers will vary. Here are some values for some different values of x :

x	0	1	2	3	4	$\frac{1}{2}$
$5 + (x + 2)^2$	9	14	21	30	41	11.25

c. An expression like $5 + (x + 2)^2$ can have an infinite number of different values, because there are an infinite number of different x 's we can choose.

d. When $2x$ is by itself, x could be any number and the value of the expression could be many different values. But in an equation like $2x = 12$, for this equation to be true, x can only have one possible value.

