

Name: \_\_\_\_\_

Date: \_\_\_\_\_



VARIABLES AND EXPRESSIONS

Algebra is the process of using the **properties of numbers** to manipulate **unknown** or **changing quantities**. These quantities are known as **variables** and are often represented using **letters** to distinguish them from numbers we do know (which we just use the numbers for). When we **group** (combine) numbers together we get what is known as an **expression**.

EXPRESSIONS

An **expression** is any combination of numbers that we know and ones that we don't (variables).

**Exercise #1:** Review **order of operations** by giving the value of each of the following purely **numerical expressions**. Do these without a calculator in order to review basic middle school number concepts.

(a)  $3 \cdot 2 + 7$

$6 + 7 = 13$

(b)  $8 - \frac{1}{2} \cdot 6 + 24 \div 6$

$8 - 3 + 24 \div 6$   
 $8 - 3 + 4$   
 $5 + 4 = 9$

(c)  $4(8-6) - 7(5-3)$

$4(2) - 7(5-3)$   
 $4(2) - 7(2)$   
 $8 - 7(2) = 8 - 14$

(f)  $\frac{-16}{2} + 5 \cdot 2$

$(-6)$

(d)  $\frac{5^2 - 4^2 + 3}{1 - 5}$

(e)  $(2-7)(5-3) + 3^2$

$\frac{-16}{2} + 5 \cdot 2 = \frac{-8 + 10}{8} = \frac{-8 + 10}{8} = \frac{2}{8} = \frac{1}{4}$

Knowing your order of operations is absolutely essential. Once we move past expressions that contain only numbers to ones that contain variables you need to be able to "read" an expression and understand what is being done to the variable.

**Exercise #2:** If the letter  $x$  represents some unknown quantity, explain the calculation that each of the following expressions involving  $x$  represents.

(a)  $3x - 8$

(b)  $\frac{x-4}{2}$

(c)  $4x^2 - 8$

$$\textcircled{1} \quad 4 + 5 \cdot 6 - 7$$
$$4 + 30 - 7$$
$$34 - 7 = \textcircled{27}$$

$$\textcircled{2} \quad 6 \cdot 5 - 4 \cdot 3$$
$$30 - 4 \cdot 3$$
$$30 - 12 = \boxed{18}$$