

**Essential Questions:** How do we perform operations with rational numbers? How do we evaluate algebraic expressions with rational numbers?

**Do Now:** Perform the indicated operation.

a.  $-9 - 8$

b.  $-10 + 5$

c.  $-14 - (-3)$

d.  $6 - 8 + 3 - 4 - 6$

e.  $(-9)(-4)(-2)$

f.  $(-1)^{24}$

g.  $12 \div -4$

h.  $|-2 - 5|$

## Operations with Integers

### Reading Variables

-N is read as "the inverse of N" or "the opposite of N"

-N means take the opposite of N or multiply N by -1

a. Evaluate  $-N$  when  $N = 5$

b. Evaluate  $-N$  when  $N = -5$

### Raising Integers to a Power



What is the difference between  $-6^2$  and  $(-6)^2$ ?

### Evaluating Algebraic Expressions with Integers

-Always follow the order of operations (PEMDAS)

-When evaluating algebraic expressions, parentheses must be used to...

- Raise a negative number to a power
- Subtract a negative number
- Show multiplication between signed numbers

Evaluate each expression when  $x = -3$ ,  $y = -2$  and  $z = 6$ . Show all work!

1.  $\frac{z}{y} - xy$

2.  $x - y^2$

3.  $-z|x - y|$

4.  $x\left(\frac{y-z}{4y}\right)^4$

5. T/F If  $x =$  any integer and  $x \neq 0$ , then  $-x^4$  is always negative.

## **Operations with Rational Numbers**

All rules that apply for integers apply for fractions, decimals and signed numbers!

a.  $-\frac{1}{4} - \frac{2}{3}$

b.  $\frac{-24}{-1.2}$

c.  $-\frac{5}{8} + \frac{1}{3}$

### **Fractions and Powers**



What is the difference between  $\frac{4^2}{9}$  and  $\left(\frac{4}{9}\right)^2$ ?

### **Order of Operations with Rational Numbers**

1.  $\frac{(-0.9)^2}{-5 + 4.7}$

2.  $\frac{1}{2} - \frac{1}{2} \div \frac{1}{4}$

3.  $\left(\frac{4}{7} - \frac{5}{7}\right)^2 \div \frac{1}{49}$

### **Evaluating Algebraic Expressions with Rational Numbers**

Evaluate when  $a = \frac{1}{4}$ ,  $b = 9$  and  $c = -0.5$ .

4.  $a - b + c$

5.  $-a^2 + c \div -\frac{1}{8}$

6.  $bc^2 - a$

7.  $-2a^2 \div \frac{1}{3}b - c^3$