

## **Curriculum Outcome**

**N1: Demonstrate an understanding of rational numbers by: comparing and ordering rational numbers; solving problems that involve arithmetic operations on rational numbers.**

**Student Friendly:**

**"BEDMAS with fractions and decimals"**

# Order of Operations

with

## Rational Numbers

# Warm Up



$$(-0.8) + 1.2 \div (-0.3) \times 1.5$$

$$= (-0.8) + (-4) \times 1.5$$

$$= (-0.8) + (-6)$$

$$= -6.8$$



# Section 3.6

## Order of Operations with Rational Numbers

Remember from  
operations

"BEDMAS" .....order of  


In the order  
that  
they appear

$$(-\#)^{\text{even}} = (+)$$

$$(-\#)^{\text{odd}} = (-)$$

*Do we need more practice?*



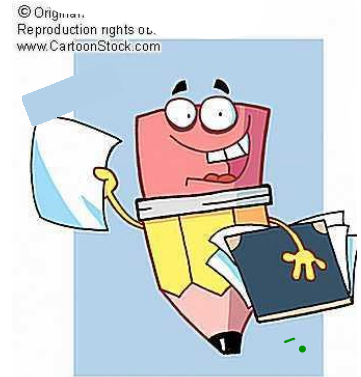
$$\begin{aligned}
 1) & (-2)^4 - [(-4) + 9]^3 \\
 & = (-2)^4 - [5]^3 \\
 & = 16 - [125] \\
 & = -109
 \end{aligned}$$

$$\begin{aligned}
 2) & [(-2 + 6)^2 + 5(-3)^2 + 7(3)]^2 \\
 & = [(4)^2 + 5(-3)^2 + 7(3)]^2 \\
 & = [(16) + 5(9) + 7(3)]^2 \\
 & = [(16) + (45) + 21]^2 \\
 & = [61 + 21]^2 \\
 & = [82]^2 \\
 & = 6724
 \end{aligned}$$

## Using the Order of Operations with Decimals

Evaluate the following:

It is no difference with  
decimals....follow **BEDMAS**



$$\begin{aligned} 1) & (-1.3) + 0.24 \times (-2)^2 \div (0.4) \\ & = (-1.3) + 0.24 \times (4) \div (0.4) \\ & = (-1.3) + (0.96) \div (0.4) \\ & = (-1.3) + (2.4) \\ & = 1.1 \end{aligned}$$



$$5^3 = \cancel{5 \times 5 \times 5}$$

↳ = 125

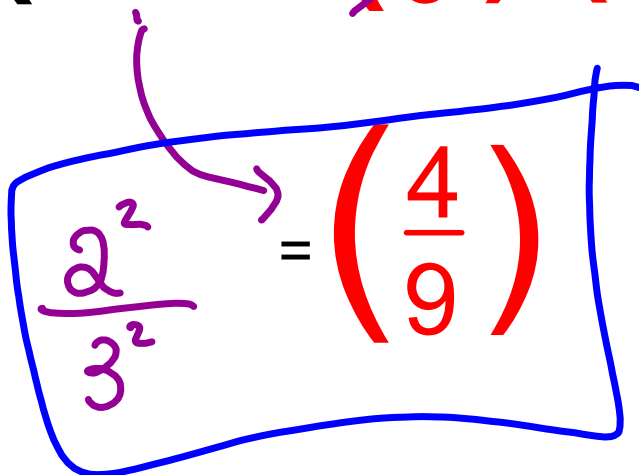
$$8^9 = 134217728$$



$$(-5)^4 = (+)$$

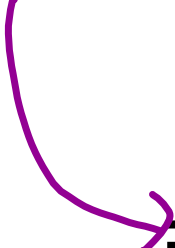
$$(-5)^3 = (-)$$

$$\left(\frac{2}{3}\right)^2 = \cancel{\left(\frac{2}{3}\right)\left(\frac{2}{3}\right)}$$



A blue hand-drawn box contains the simplified calculation. On the left, the fraction  $\frac{2^2}{3^2}$  is written in purple. An arrow points from the exponent 2 in the original expression to the exponent 2 in the numerator. To the right of the fraction is an equals sign, followed by the fraction  $\left(\frac{4}{9}\right)$  in red.

$$\frac{2^2}{3^2} = \left(\frac{4}{9}\right)$$

$$\left(\frac{5}{6}\right)^3 = \frac{5^3}{6^3}$$

$$= \left(\frac{125}{216}\right)$$

$$\left(\frac{2}{3}\right)^{12} = \left(\frac{4096}{531441}\right)$$

## Fractions

Remember fractions are just numbers

$$\left(\frac{2}{5}\right)^2 \div \left(\frac{2}{3} + \frac{4}{5}\right)$$

$$= \left(\frac{2}{5}\right)^2 \div \left(\frac{10}{15} + \frac{12}{15}\right)$$

$$= \left(\frac{2}{5}\right)^2 \div \left(\frac{22}{15}\right)$$

$$= \left(\frac{4}{25}\right) \div \left(\frac{22}{15}\right)$$

$$= \left(\frac{4}{25}\right) \times \left(\frac{15}{22}\right) = \frac{60}{550} = \frac{6}{55}$$

*Must always reduce*

$$= \left(\frac{2}{5}\right) \left(\frac{3}{11}\right)$$

$$= \left(\frac{6}{55}\right)$$



# Do we need more practice?



1)

$$\left(-1\frac{3}{4}\right) - \left(-3\frac{1}{2} + 5\right)\left(-3\frac{1}{2} + 5\right)$$

Remember to switch mixed to improper fractions

$$= \left(\frac{-7}{4}\right) - \left[\frac{-7}{2} + \frac{5}{1}\right]\left[\frac{-7}{2} + \frac{5}{1}\right]$$

Make common denominators inside brackets

$$= \left(\frac{-7}{4}\right) - \left[\frac{-7}{2} + \frac{10}{2}\right]\left[\frac{-7}{2} + \frac{10}{2}\right]$$

Complete Brackets

Multiply

$$= \left(\frac{-7}{4}\right) - \left[\frac{3}{2}\right]\left[\frac{3}{2}\right]$$

$$= \left(\frac{-7}{4}\right) - \left[\frac{9}{4}\right]$$

$$= \frac{-16}{4}$$

$$= -4$$

### You Try

$$\left[ \frac{1}{2} + \frac{2}{5} \right]^2 \div \left[ \frac{-3}{4} \times \frac{1}{2} \right]^2$$

$$\left[ \frac{5}{10} + \frac{4}{10} \right]^2 \div \left[ \frac{-3}{8} \right]^2$$

$$\left[ \frac{9}{10} \right]^2 \div \left[ \frac{9}{64} \right]^2$$

$$\frac{81}{100} \div \left[ \frac{9}{64} \right]$$

$$\frac{\cancel{81}^9}{\cancel{100}^{25}} \times \frac{\cancel{64}^{16}}{\cancel{9}_1} = \frac{5184}{900} = \frac{144}{25}$$

$$= \frac{144}{25}$$

# *Class / Homework*

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## Questions

3, 4,

Write out the questions and show all work!  
(Hint take your time and do one step at a time)