

Section 3.6 - Order of Operations with Rational Numbers



B - Brackets
E - Exponents
D } Division or Multiplication in the order they appear
M }
A } Addition or Subtraction in the order they appear
S }

Ex: Evaluate

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

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

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

$$-6.8$$

Evaluate:

$$\begin{aligned} & (-3.2) - 0.9 \div [0.7 - (-1.2)]^2 \\ & = (-3.2) - 0.9 \div [0.7 + 1.2]^2 \\ & = (-3.2) - 0.9 \div (1.9)^2 \\ & = (-3.2) - 0.9 \div 3.61 \\ & = (-3.2) - 0.249307479 \\ & = (-3.449307479) \\ & = (-3.4) \end{aligned}$$

Try these...

a) $(-2.4) \div 1.2 - 7 \times 0.2$

b) $(-3.4 + 0.6) + 4^2 \times 0.2$

c) $4.6 - 3^2 + 3.9 \div (-1.3)$

Pull

Pull

Pull

Solving Problems

ex: The formula $C = (F - 32) \div 1.8$ converts temperatures in degrees Fahrenheit (F) to Celsius (C).

What is 28.4°F in $^{\circ}\text{C}$?

Solution:

Substitute $F = 28.4$ in the formula

$$\begin{aligned} C &= (F - 32) \div 1.8 \\ &= (28.4 - 32) \div 1.8 \\ &= (-3.6) \div 1.8 \\ &= (-2) \end{aligned}$$

$$\bullet \bullet \bullet \quad 28.4^{\circ}\text{F} = -2^{\circ}\text{C}$$

What would be the temperature in $^{\circ}\text{C}$ if the Fahrenheit temperature was...

a) 12.8°

b) 45.9°

Using Order of Operations with Fractions



Ex: Evaluate

$$\left(\frac{3}{4} - \frac{7}{8}\right) \div \left(\frac{-5}{16}\right) \quad \leftarrow \text{Find a common denominator for 4 \& 8}$$

$$= \left(\frac{6}{8} - \frac{7}{8}\right) \div \left(\frac{-5}{16}\right) \quad \leftarrow \text{Subtract fractions}$$

$$= \left(\frac{-1}{8}\right) \div \left(\frac{-5}{16}\right) \quad \leftarrow \text{Cross Reduce if possible}$$

$$= \left(\frac{-1}{\cancel{8}}\right) \times \left(\frac{\cancel{-16}}{5}\right)^2 \quad \leftarrow \begin{array}{l} \text{Multiply numerators} \\ \text{Multiply denominators} \end{array}$$

$$= \frac{2}{5}$$

Example:

$$\left(\frac{-2}{3}\right) \times \frac{1}{6} + \frac{1}{2}$$

$$= \left(\frac{-2}{3}\right) \times \frac{1}{6} + \frac{1}{2}$$

$$= \left(\frac{-1}{9}\right) + \frac{1}{2}$$

$$= \left(\frac{-2}{18}\right) + \frac{9}{18}$$

$$= \frac{7}{18}$$

Try... $\left(\frac{-1}{2}\right)\left(\frac{-1}{2}\right) - \left(\frac{-2}{3}\right) \div \left[\frac{1}{3} + \left(\frac{-3}{12}\right)\right]$

$$\left(\frac{-1}{2}\right)\left(\frac{-1}{2}\right) - \left(\frac{-2}{3}\right) \div \left[\frac{1}{3} + \left(\frac{-3}{12}\right)\right]$$

$$= \left(\frac{-1}{2}\right)\left(\frac{-1}{2}\right) - \left(\frac{-2}{3}\right) \div \left[\frac{4}{12} + \left(\frac{-3}{12}\right)\right]$$

$$= \left(\frac{-1}{2}\right)\left(\frac{-1}{2}\right) - \left(\frac{-2}{3}\right) \div \frac{1}{12}$$

$$= \frac{1}{4} - \left(\frac{-2}{3}\right) \div \frac{1}{12}$$

$$= \frac{1}{4} - \left(\frac{-2}{3}\right) \div \frac{1}{12}$$

$$= \frac{1}{4} - (-8)$$

$$= \frac{1}{4} + \left(\frac{8}{1}\right)$$

$$= \frac{1}{4} + \left(\frac{32}{4}\right)$$

$$= \frac{33}{4} \text{ or } 8\frac{1}{4}$$

Practice: Page 140

#s 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

Extra Practice six

Review pp. 144 - 145

Practice Test: page 146