

3.6 – Order of Operations with Rational Numbers

Recall the order of operations:

- 1) Brackets – complete innermost brackets first if there are several
- 2) Exponents
- 3) Division/Multiplication – solve the furthest to the left first if there is more than one
- 4) Addition/Subtraction – solve the furthest to the left first if there is more than one

Ex 1: Evaluate.

$$\begin{aligned}
 \text{(a) } & -0.8 + 1.2 \div (-0.3) \times 1.5 \\
 & = -0.8 + \underline{(-4) \times 1.5} \\
 & = -0.8 + \underline{(-6.0)} \\
 & = \boxed{-6.8}
 \end{aligned}$$

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

Ex. 2: To convert a temperature in Fahrenheit to Celsius, we use the formula: $C = \left(\frac{F-32}{1.8}\right)$ The lowest natural temperature ever directly recorded at ground level on Earth is -128.5°F , which was in Antarctica, on July 21, 1983. What is this temperature in degrees Celsius?

$$\begin{array}{r}
 -128.2 \\
 -32 \\
 \hline
 -160.2
 \end{array}$$

$$C = \frac{-128.2 - 32}{1.8}$$

$$C = \frac{-160.2}{1.8}$$

$$C = -89^\circ$$

Ex. 3: Evaluate $(-\frac{1}{2})(-\frac{1}{2}) - (-\frac{2}{3}) \div \left[\frac{1}{3} + (-\frac{1}{4}) \right]$

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

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

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

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

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

$$= \frac{1}{4} + 8$$

$$= 8\frac{1}{4}$$

Assignment: 3.6 Blue practice