

Review: Given that  $\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R}$

$$A = \left\{ \frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \underline{1}, \underline{2}, \underline{4}, \underline{8} \right\} \quad B = \{ \pi, \sqrt{2} \}$$

$$C = \{ \text{all irrational numbers} \} \quad \{1\}$$

Find:

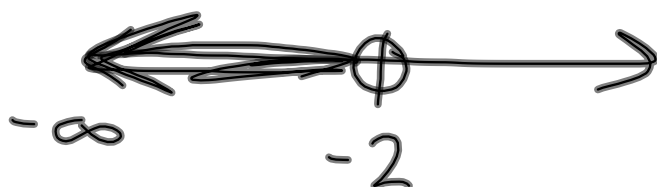
$$A \cap \mathbb{Q} = A \quad A \cap \mathbb{N} = \{1, 2, 4, 8\} \quad B \cap C = B \quad \{1, 2\}$$

$$A \cup \mathbb{Q} = \mathbb{Q} \quad B \cup \mathbb{R} = \mathbb{R} \quad C \cap \emptyset = \emptyset \quad \{1, 2, 3, 4\}$$

$$C \cap \mathbb{Q} = \emptyset \quad C \cap \mathbb{R} = C \quad A \cup \emptyset = A$$

1.1

88.  $(-\infty, -2)$



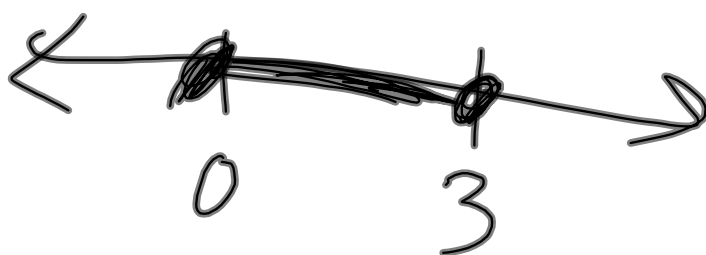
$$\{x \mid x < -2\}$$

$$(-\infty, -2]$$

$$\{x \mid x \leq -2\}$$

~~$$(5, -2)$$~~

$$94. \{x \mid 0 \leq x \leq 3\}$$



$$[0, 3]$$



$$(-\infty, 2] \cup (4, \infty)$$

$$\{x \mid x \leq 2 \text{ or } x > 4\}$$

## 1.2 Operations on Rational Numbers

additive identity      0

$$a + 0 = a, \quad 0 + a = a$$

additive inverse       $-a$

$$a + (-a) = 0, \quad (-a) + a = 0$$

subtraction

$$a - b = a + (-b)$$

Multiplication

$$2 \cdot 3 = 6 \quad 2(-3) = -6$$

$$(-2)(-3) = 6$$

Division

$$a \div b = \frac{a}{1} \cdot \frac{1}{b}, \quad b \neq 0$$

$$\frac{0}{a} = 0, \quad a \neq 0$$

$$\frac{a}{a} = 1, \quad a \neq 0$$

$$\frac{a}{1} = a$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\begin{aligned} \frac{a}{c} + \frac{b}{d} &= \frac{a}{c} \cdot \frac{d}{d} + \frac{b}{d} \cdot \frac{c}{c} \\ &= \frac{ad}{cd} + \frac{bc}{cd} = \frac{ad+bc}{cd} \end{aligned}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

$$a^n = \underbrace{a \cdot a \cdot a \cdots a}_{n \text{ times}} \quad \text{exponentiation}$$

$$5^3 = 5 \cdot 5 \cdot 5$$

## Order of Operations

P E M D A S

parentheses  
(brackets, absolute value)

ponents

ultiply

ivide

of

ubtract

1.2

$$\textcircled{34.} - 9 - |-7 - (-15)|$$

$$= -9 - |-7 + 15|$$

$$= -9 - |8| = -9 - 8$$

$$= \boxed{-17}$$

$$90. -3(-2)^2(-5)$$

$$= -3(4)(-5)$$

$$= \boxed{60}$$



$$\begin{aligned}
 & \text{111. } \frac{1}{2} - \frac{\frac{17}{25}}{\frac{4 - \frac{3}{5}}{1}} + \frac{1}{5} \\
 &= \frac{1}{2} - \frac{\frac{17}{25}}{\frac{17}{5}} + \frac{1}{5} \quad \left( \begin{array}{l} \text{mixed} \\ \# \end{array} \right) \\
 &= \frac{1}{2} - \frac{\cancel{17}^1}{\cancel{25}_5} \cdot \frac{\cancel{5}^1}{\cancel{17}_1} + \frac{1}{5} \quad \left( \begin{array}{l} \text{imp} \\ \text{get} \\ \text{fraction} \end{array} \right) \\
 &= \frac{1}{2} - \frac{1}{5} + \frac{1}{5} = \boxed{\frac{1}{2}}
 \end{aligned}$$

106.  $25 \div 5 \left( \frac{16+8}{-2^2+8} \right) - 5$

$25 \div 5 \left( \frac{24}{4} \right) - 5$

$25 \div 5(6) - 5$

$5(6) - 5 = \boxed{25}$

$-2^2 \neq (-2)^2$

$(-1)(2^2)$

114.  $\frac{3}{4} \div \left[ \frac{5}{8} - \frac{5}{12} \right] + 2$

$\frac{25}{5(6)}$

$\frac{25}{5}(6)$

$\frac{3}{4} \div \left[ \frac{5 \cdot 3}{8 \cdot 3} - \frac{5 \cdot 2}{12 \cdot 2} \right] + 2$

$\frac{5}{24}$   $\frac{10}{24}$

$= \frac{3}{4} \div \frac{5}{24} + 2 = \frac{3}{4} \cdot \frac{24}{5} + 2$

$= \frac{18}{5} + \frac{2 \cdot 5}{1 \cdot 5} = \boxed{\frac{28}{5}}$

1.2  
21-28, 103-  
114

10 min.  
Khas Academy