

7 - CHAPTER 4: RATIONAL NUMBERS - NOTE SHEET

NAME: Miss Cramer

HOUR: 6th

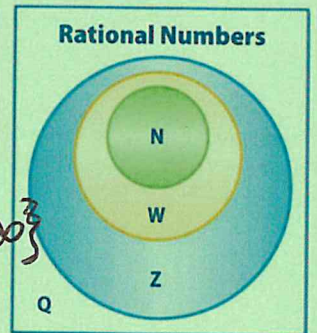
Lesson 4.1: Terminating and Repeating Decimals

Vocabulary		
Term	Definition	Example
Repeating Decimal	decimals that repeat in specific patterns	0.181818 0.3858585
Bar Notation	Used to indicate the specific pattern	0. $\overline{18}$ 0. $\overline{385}$
Terminating Decimal	A decimal that ends	0.25 0.125

Fraction to Decimal	Decimal to Fraction
$\begin{array}{r} 1 \\ -3\frac{1}{8} \\ \hline 0.125 \\ 8 \overline{)10} \\ \underline{-8} \downarrow \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$ $\boxed{-3.125}$	$\begin{array}{r} 21 \\ \frac{21}{33} \\ \hline 0.636 \\ 33 \overline{)210} \\ \underline{-198} \downarrow \\ 120 \\ \underline{-99} \\ 210 \\ \underline{-198} \\ 12 \end{array}$ $\boxed{0.\overline{63}}$
	$7.56 = \frac{56}{100} = \frac{28}{50} = \frac{14}{25}$ $\frac{14}{25} \quad \boxed{7\frac{14}{25}}$ <p>14: 1, 2, 7, 14 25: 1, 5, 25</p>

Lesson 4.2: Compare and Order Rational Numbers

Vocabulary	
Term	Definition
Natural Numbers	$N = \{1, 2, 3, \dots, \infty\}$
Whole Numbers	$W = \{0, 1, 2, 3, \dots, \infty\}$
Integers	$Z = \{-\infty, \dots, -3, -2, -1, 0, 1, 2, \dots, \infty\}$
Rational Numbers	Numbers that can be written as fractions. $Q = \{-\infty, \dots, -1.5, -\frac{1}{2}, 0, 1, 1.75, \dots, \infty\}$



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How to compare and order rational numbers...

Convert to decimal form

Lesson 4.3: Add and Subtract Like Fractions

Vocabulary

Term	Definition	Example
Like Fractions	Fractions with the same denominator	

Key Concepts

To add/subtract fractions with like denominators,

add/subtract the numerator and keep the denominator * Simplify if necessary

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

$$\frac{-3}{5} + \frac{-1}{5} = \frac{-3 + -1}{5} = \boxed{\frac{-4}{5}}$$

$$\frac{6}{5} + \frac{4}{5}$$

$$\frac{6 + 4}{5} = \frac{10}{5} = \boxed{2}$$

$$-\frac{5}{8} - \frac{3}{8}$$

$$\frac{-5 - 3}{8} = \frac{-8}{8} = \boxed{-1}$$

$$\frac{5}{13} - \frac{7}{13}$$

$$\frac{5 - 7}{13} = \boxed{\frac{-2}{13}}$$

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Lesson 4.4: Add and Subtract Unlike Fractions

Vocabulary		
Term	Definition	Example
Common Multiples	Numbers that can be gotten through multiplication and are shared between two numbers.	
Least Common Multiple	The smallest shared multiple	
Unlike Fractions	Fractions with different denominators	$\frac{7}{12}$ $\frac{9}{13}$

Key Concepts

To add/subtract fractions with unlike denominators,

- write equivalent fractions using the least common denominator.
- Add/subtract the numerators

$$\frac{1}{6} + \frac{3}{4}$$

$$\begin{array}{l} 6: 6, \textcircled{12}, 18 \\ 4: 4, 8, \textcircled{12} \end{array} \quad \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$$

$$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$$

$$\frac{2}{12} + \frac{9}{12} = \boxed{\frac{11}{12}}$$

$$-\frac{3}{8} + \frac{5}{24}$$

$$\begin{array}{l} 8: 8, 16, \textcircled{24}, 32 \\ 24: \textcircled{24}, 48, 72 \end{array} \quad \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

$$-\frac{9}{24} + \frac{5}{24} = \frac{-9+5}{24} = \frac{-4}{24}$$

$$\boxed{-\frac{1}{6}}$$

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$\frac{3}{4} - \frac{8}{9}$ <p>4: 4, 8, 12, 16, 20, 24, 28, 32, 36</p> <p>9: 9, 18, 27, 36, 45</p> $\frac{3 \times 9}{4 \times 9} = \frac{27}{36}$ $\frac{8 \times 4}{9 \times 4} = \frac{32}{36}$ $\frac{27}{36} - \frac{32}{36} = \frac{27 - 32}{36} = \frac{-5}{36}$	$-\frac{2}{3} - \frac{1}{2}$ <p>3: 3, 6, 9, 12, 15</p> <p>2: 2, 4, 6, 8, 10, 12</p> $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$ $-\frac{4}{6} - \frac{3}{6} = \frac{-4 - 3}{6} = \frac{-7}{6}$
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Lesson 4.5: Add and Subtract Mixed Numbers

Key Concepts	
<p><u>Mixed Number to Improper Fraction:</u></p> <ol style="list-style-type: none"> ① Multiply the whole number by the denominator. ② Add that product with the numerator 	$\frac{67}{9} = 7 \frac{4}{9}$ <p>7 · 9 = 63 63 + 4 = 67</p>
<p><u>Improper Fraction to Mixed Number</u></p> <ol style="list-style-type: none"> ① Find out how many times the denominator goes into the numerator ② Subtract the whole number out 	$\frac{17}{3} = 5 \frac{2}{3}$ <p>3: 3, 6, 9, 12, 15, 18 17 - 15 = 2</p>

Key Concept	
<p><u>Split apart the mixed number:</u></p> $7 \frac{2}{3} + 10 \frac{5}{9}$ $(7 + 10) + \left(\frac{2}{3} + \frac{5}{9}\right)$ <p>17 3: 3, 6, 9, 12</p> $\frac{2 \times 3}{3 \times 3} = \frac{6}{9}$ $\frac{6}{9} + \frac{5}{9} = \frac{11}{9}$ $17 + \frac{11}{9} = 17 + 1 \frac{2}{9} = \boxed{18 \frac{2}{9}}$	<p><u>Make into improper fractions:</u></p> $7 \frac{1}{6} - 6 \frac{5}{8}$ $\frac{43}{6} - \frac{53}{8}$ $\frac{43 \times 4}{6 \times 4} = \frac{172}{24}$ $\frac{53 \times 3}{8 \times 3} = \frac{159}{24}$ $\frac{172}{24} - \frac{159}{24} = \frac{13}{24}$ <p>6: 6, 12, 18, 24 8: 8, 16, 24</p>

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Lesson 4.6: Multiplying Fractions

Key Concepts

To multiply fractions,

- Multiply the numerator
- Multiply the denominator

• simplify

$$\frac{1}{2} \cdot \frac{2}{3} = \frac{2 \div 2}{6 \div 2} = \boxed{\frac{1}{3}}$$

To multiply mixed numbers,

- Convert into improper fractions
- Multiply numerators
- Multiply denominators
- simplify

Lesson 4.6: ^{Dividing} Multiplying Fractions

Vocabulary

Term	Definition
Reciprocal	Flipped version of a fraction $\frac{1}{4} \rightarrow \frac{4}{1}$ $\frac{2}{3} \rightarrow \frac{3}{2}$ $2\frac{3}{4} = \frac{11}{4} \rightarrow \frac{4}{11}$

Key Concepts

To divide fractions, multiply by the reciprocal of the second fraction

$$\frac{1}{3} \div \frac{5}{1} = \frac{1}{3} \cdot \frac{1}{5} = \frac{1}{15} \qquad \frac{3}{4} \div \left(-\frac{1}{2}\right) = \frac{3}{4} \cdot \left(\frac{-2}{1}\right) = \frac{-6}{4} = -\frac{3}{2}$$

To divide mixed numbers,

- ① convert all mixed numbers into improper fractions
- ② multiply the reciprocal of the second fraction

$$\frac{2}{3} \div 3\frac{1}{3} = \frac{2}{3} \div \frac{10}{3} = \frac{2}{3} \cdot \frac{3}{10} = \frac{6 \div 6}{30 \div 6} = \boxed{\frac{1}{5}}$$

$$3\frac{1}{3} = \frac{10}{3}$$

10

11

12