

**Math Mastery Summer-Seventh Grade**  
**Review Sheet**

### Finding GCF and LCM Using Prime Factorization

Finding GCF using prime factorization:

Step 1: Find the prime factorization of each number.

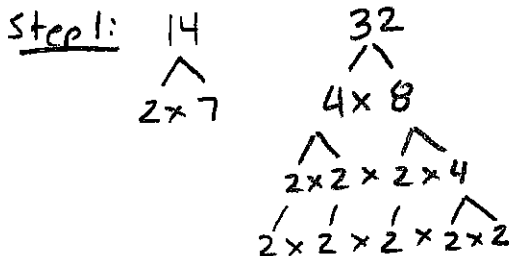
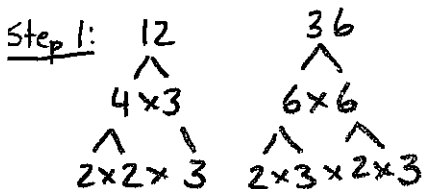
Step 2: Identify the common prime factors.

Step 3: Multiply the common prime factors to find the GCF.

Ex 1: Find the GCF of each of the following using prime factorization.

a. 12 and 36

b. 14 and 32



Step 2:

$$12: (2) \times (2) \times (3) = 2^2 \times 3$$

$$36: (2) \times (2) \times (3) \times 3 = 2^2 \times 3^2$$

Step 2:

$$14: (2) \times 7$$

$$32: (2) \times 2 \times 2 \times 2 \times 2 = 2^5$$

Step 3:  $GCF = 2 \times 2 \times 3 = 2^2 \times 3$

$$= \boxed{12}$$

Step 3:  $GCF = \boxed{2}$

Finding LCM using prime factorization:

Step 1: Find the prime factorization of each number.

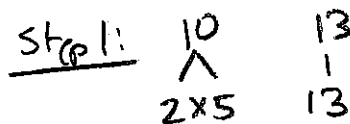
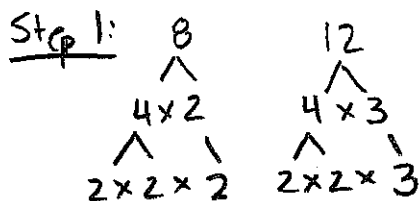
Step 2: Find the shortest string of prime factors that contains the prime factorization of the numbers.

Step 3: Multiply the string. The product is the LCM.

Ex 1: Find the LCM of each of the following using prime factorization.

a. 8 and 12

b. 10 and 13



Step 2:

	2	3
8 = 2 × 2 × 2 = 2 <sup>3</sup>	3	0
12 = 2 × 2 × 3 = 2 <sup>2</sup> × 3	2	1

Step 2:

	2	5	13
10 = 2 × 5	1	1	0
13 = 13	0	0	1

Step 3:  $LCM = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$

$$= \boxed{24}$$

Step 3:  $LCM = 2 \times 5 \times 13 = \boxed{130}$

## Adding Decimals

Step 1: Line up the decimal points so that the place values line up. Write zeros to make the columns even.

Step 2: Add to find the sum (the answer to an addition problem). Don't forget to carry (regroup), if necessary.

Ex:  $12.257 + 0.9$

$$\begin{array}{r} 12.257 \\ + 0.900 \\ \hline 13.157 \end{array}$$

Ex:  $4.8 + 0.92$

$$\begin{array}{r} 4.80 \\ + 0.92 \\ \hline 5.72 \end{array}$$

## Subtracting Decimals

Step 1: Line up the decimal points so that the place values line up. Write zeros to make the columns even.

Step 2: Subtract to find the difference (the answer to a subtraction problem). Don't forget to borrow (regroup), if necessary.

Ex:  $17.94 - 3.2$

$$\begin{array}{r} 17.94 \\ - 3.20 \\ \hline 14.74 \end{array}$$

Ex:  $5.2 - 3.74$

$$\begin{array}{r} 5.20 \\ - 3.74 \\ \hline 1.46 \end{array}$$

## Multiplying Decimals

Step 1: Multiply as if both factors (the 2 numbers being multiplied) are whole numbers.

Step 2: Place the decimal point in the product (the answer to a multiplication problem) so that the number of decimal places in the product is equal to the sum (the answer to an addition problem) of the decimal places in the factors.

Ex:  $17 \times 4.1$

$$\begin{array}{r} 17 \leftarrow 0 \text{ decimal places} \\ \times 4.1 \leftarrow 1 \text{ decimal place} \\ \hline 17 \\ + 680 \\ \hline 69.7 \leftarrow 0+1=1 \text{ decimal place} \end{array}$$

Ex:  $100 \times 0.6924$

Since we are multiplying by 100 we can move the decimal the number of zeros (2) to the right.

$$0.6924 = \boxed{69.24}$$

## Dividing Decimals by Whole Numbers

Step 1: Divide as with whole numbers. Place the decimal point in the quotient above the number in the dividend.

Ex:  $22.88 \div 11$   
dividend      divisor

$$\begin{array}{r} \boxed{2.08} \\ 11 \overline{) 22.88} \\ \underline{-22} \downarrow \\ 08 \\ \underline{-0} \downarrow \\ 88 \\ \underline{-88} \\ \hline \end{array}$$

Ex:  $44.7 \div 1000$

Since we are dividing by 1000, we can move the decimal the number of zeros (3) to the left.

$$44.7 = \boxed{0.0447}$$

## Dividing Decimals by Decimals

Step 1: Move the decimal point in the divisor as many places to the right as necessary to make a whole number. Move the decimal point in the dividend the same number of places to the right.

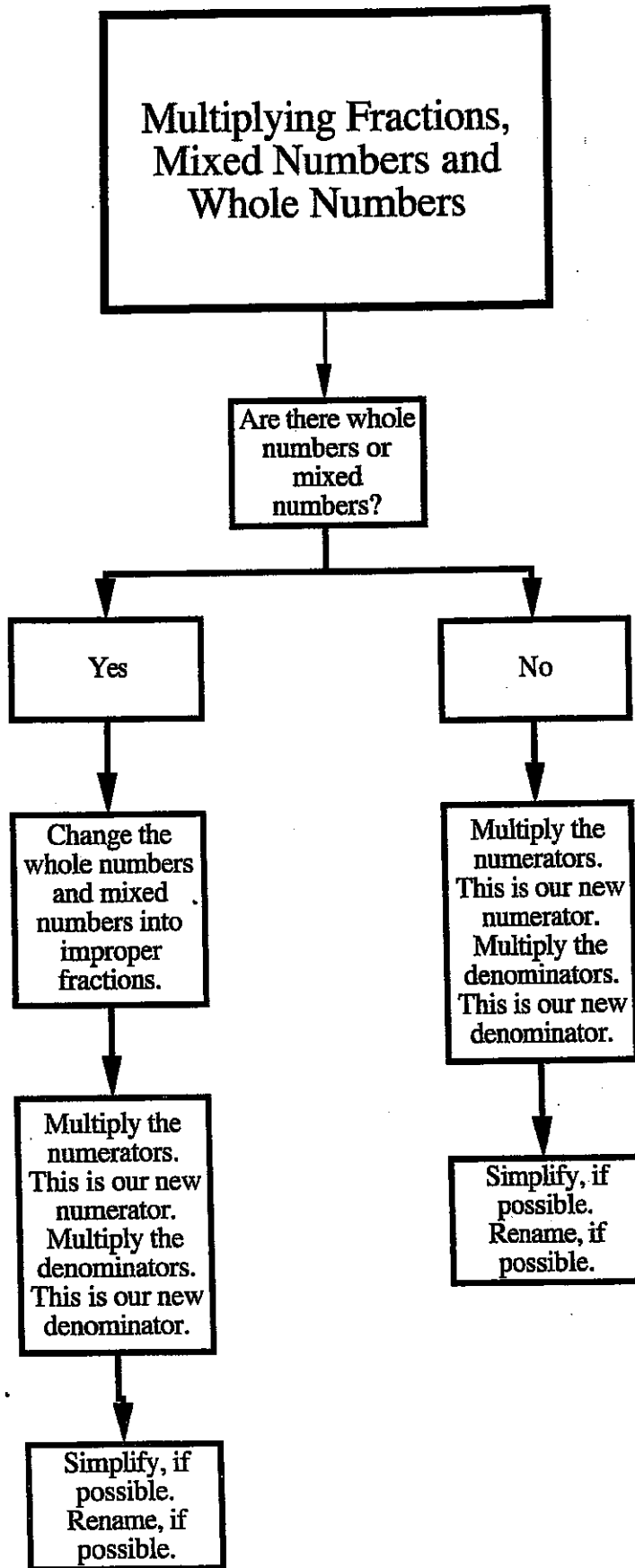
Step 2: Divide.

Ex:  $24 \div 0.16$

$$\begin{array}{r} 150. = \boxed{150} \\ 0.16 \overline{) 24.00} \\ \underline{-16} \downarrow \\ 80 \\ \underline{-80} \downarrow \\ 00 \\ \underline{-0} \\ \hline \end{array}$$

Ex:  $12.5 \div 0.4$

$$\begin{array}{r} \boxed{31.25} \\ 0.4 \overline{) 12.500} \\ \underline{-12} \downarrow \\ 05 \\ \underline{-4} \downarrow \\ 90 \\ \underline{-8} \downarrow \\ 20 \\ \underline{-20} \\ \hline \end{array}$$



## Multiplying Fractions, Mixed Numbers, and Whole Numbers

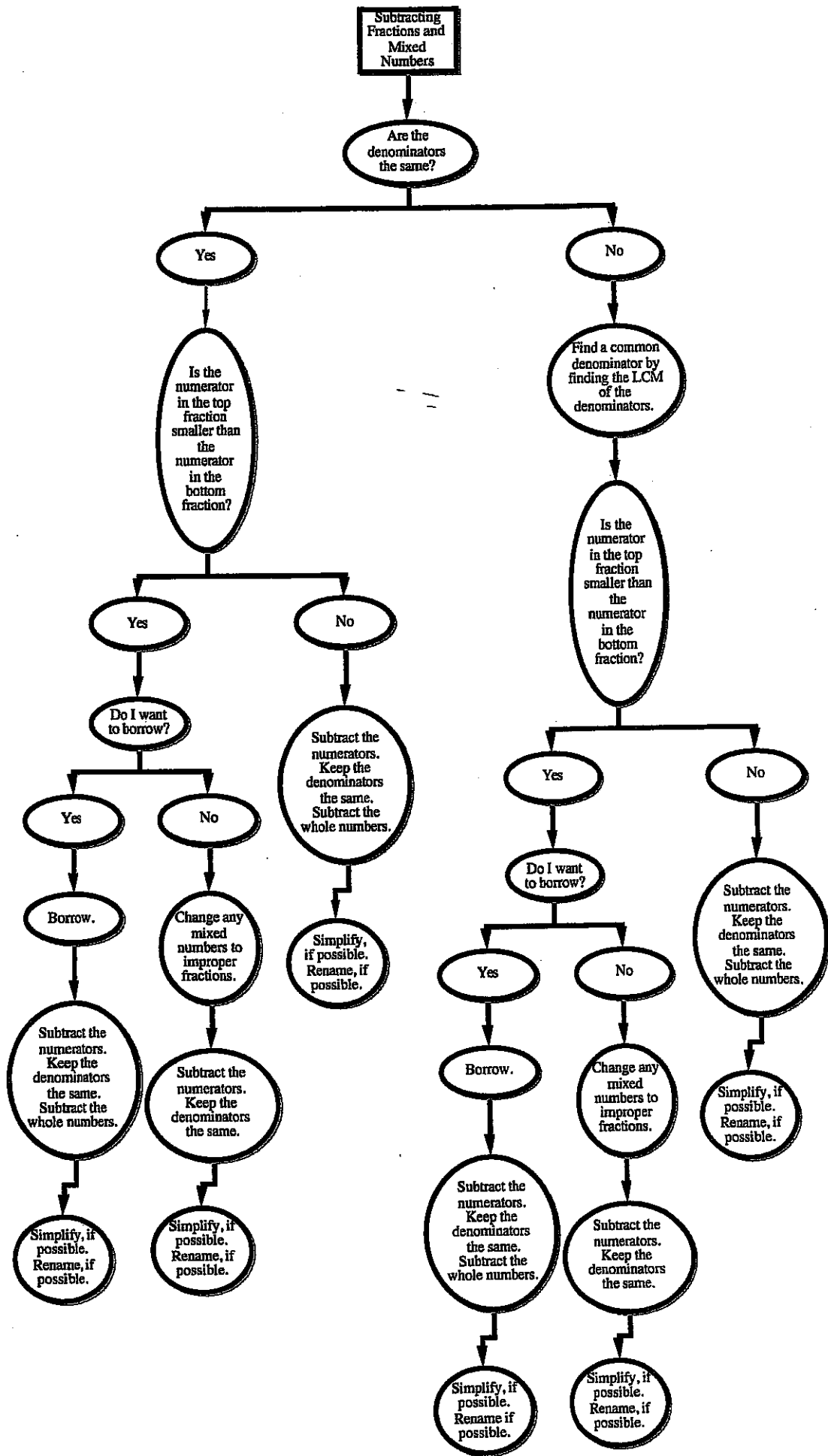
Find each product.

$$1. \text{ Ex. 1: } \frac{5}{6} \times \frac{3}{10} = \frac{5 \times 3}{6 \times 10} = \frac{15 \div 5}{60 \div 5} = \frac{3 \div 3}{12 \div 3} = \boxed{\frac{1}{4}}$$

$$2. \text{ Ex. 2: } 4\frac{1}{2} \times 3\frac{5}{6} = \frac{9}{2} \times \frac{23}{6} = \frac{9 \times 23}{2 \times 6} = \frac{207 \div 3}{12 \div 3} = \frac{69}{4} = \boxed{17\frac{1}{4}}$$

$$3. \text{ Ex. 3: } \frac{2}{3} \text{ of } 16 = \frac{2}{3} \times \frac{16}{1} = \frac{2 \times 16}{3 \times 1} = \frac{32}{3} = \boxed{10\frac{2}{3}}$$

$$4. \text{ Ex. 4: } 6 \times 2\frac{1}{3} = \frac{6}{1} \times \frac{7}{3} = \frac{6 \times 7}{1 \times 3} = \frac{42}{3} = \boxed{14}$$



## Subtracting Fractions and Mixed Numbers

Find each difference.

1. Ex. 1:  $\frac{11}{15} - \frac{8}{15}$

$$\begin{array}{r} \frac{11}{15} \\ - \frac{8}{15} \\ \hline \end{array}$$

$$\frac{11-8}{15} = \frac{3 \div 3}{15 \div 3} = \boxed{\frac{1}{5}}$$

2. Ex. 2:  $\frac{11}{12} - \frac{5}{8}$

$$\begin{array}{r} \frac{11 \times 2}{12 \times 2} = \frac{22}{24} \\ - \frac{5 \times 3}{8 \times 3} = -\frac{15}{24} \\ \hline \end{array}$$

$$\frac{22-15}{24} = \boxed{\frac{7}{24}}$$

3. Ex. 3:  $6\frac{3}{4} - 2\frac{1}{4}$

$$\begin{array}{r} 6\frac{3}{4} \\ - 2\frac{1}{4} \\ \hline \end{array}$$

$$6-2\frac{3-1}{4} = 4\frac{2 \div 2}{4 \div 2} = \boxed{4\frac{1}{2}}$$

4. Ex. 4:  $6\frac{3}{8} - 3\frac{3}{4}$

$$\begin{array}{r} 6\frac{3}{8} = 6\frac{3}{8} = 5\frac{11}{8} \\ - 3\frac{3 \times 2}{4 \times 2} = -3\frac{6}{8} = -3\frac{6}{8} \\ \hline \end{array}$$

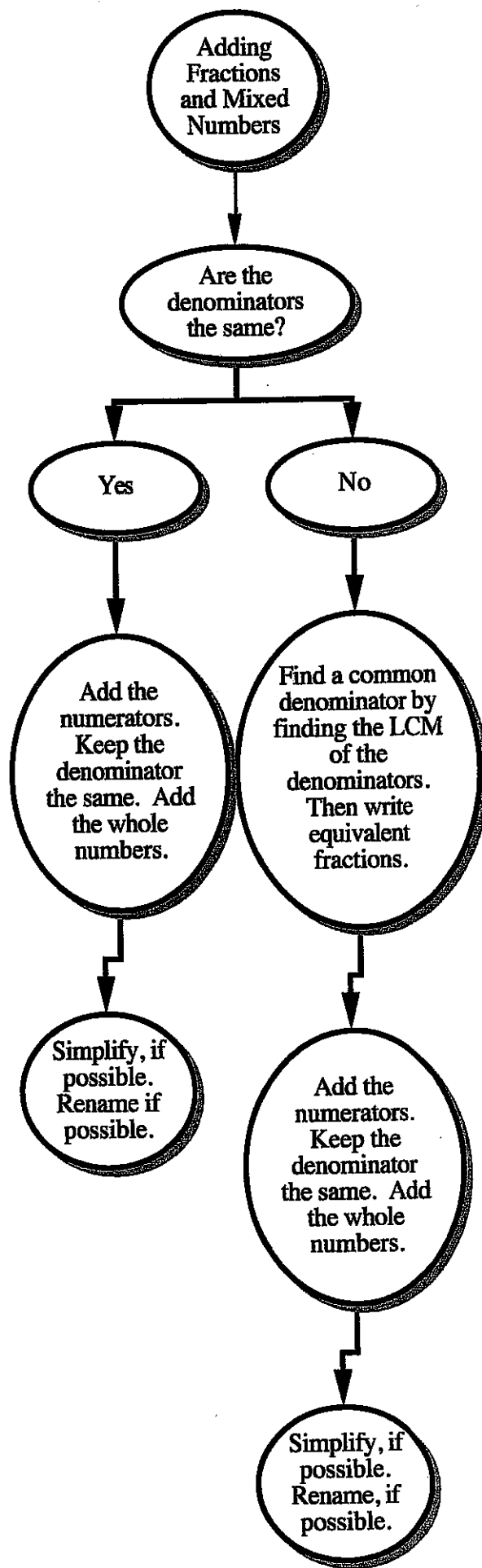
$$5-3\frac{11-6}{8} = \boxed{2\frac{5}{8}}$$

OR

$$\begin{array}{r} 6\frac{3}{8} = 6\frac{3}{8} = \frac{51}{8} \\ - 3\frac{3 \times 2}{4 \times 2} = -3\frac{6}{8} = -\frac{29}{8} \\ \hline \end{array}$$

$$\frac{51-29}{8} = \frac{22}{8} = \boxed{2\frac{5}{8}}$$





## Adding Fractions and Mixed Numbers

Find each sum.

1. Ex. 1:  $\frac{11}{12} + \frac{5}{12}$

$$\begin{array}{r} \frac{11}{12} \\ + \frac{5}{12} \\ \hline \frac{11+5}{12} = \frac{16 \div 4}{12 \div 4} = \frac{4}{3} = \boxed{1\frac{1}{3}} \end{array}$$

2. Ex. 2:  $\frac{5}{8} + \frac{3}{18}$

$$\begin{array}{r} \frac{5 \times 9}{8 \times 9} = \frac{45}{72} \\ + \frac{3 \times 4}{18 \times 4} = \frac{12}{72} \\ \hline \frac{45+12}{72} = \frac{57 \div 3}{72 \div 3} = \frac{19}{24} \end{array}$$

3. Ex. 3:  $1\frac{1}{3} + 2\frac{3}{4}$

$$\begin{array}{r} 1\frac{1 \times 4}{3 \times 4} = 1\frac{4}{12} \\ + 2\frac{3 \times 3}{4 \times 3} = 2\frac{9}{12} \\ \hline 1+2 \frac{4+9}{12} = 3\frac{13}{12} = \boxed{4\frac{1}{12}} \end{array}$$

# Dividing Fractions, Mixed Numbers and Whole Numbers

Are there whole numbers or mixed numbers?

Yes

Change the whole numbers and mixed numbers into improper fractions.

Do NOT change the first fraction. Change the  $\div$  sign to a  $\times$  sign. Find the reciprocal of the second fraction.

Multiply the numerators. This is our new numerator. Multiply the denominators. This is our new denominator.

Simplify, if possible. Rename, if possible.

No

Do NOT change the first fraction. Change the  $\div$  sign to a  $\times$  sign. Find the reciprocal of the second fraction.

Multiply the numerators. This is our new numerator. Multiply the denominators. This is our new denominator.

Simplify, if possible. Rename, if possible.

**Dividing Fractions, Mixed Numbers, and Whole Numbers**

1. reciprocals: two numbers that have a product of 1; to find a reciprocal of a number switch the numerator and denominator

Ex: Find the reciprocal of each.

a.  $\frac{2}{7}$  reciprocal:  $\boxed{\frac{7}{2}}$

b.  $9 = \frac{9}{1}$  reciprocal:  $\boxed{\frac{1}{9}}$

c.  $2\frac{1}{5} = \frac{11}{5}$  reciprocal:  $\boxed{\frac{5}{11}}$

2. Find each quotient.

1. Ex. 1:  $\frac{6}{7} \div \frac{3}{4} = \frac{6}{7} \times \frac{4}{3} = \frac{6 \times 4}{7 \times 3} = \frac{24 \div 3}{21 \div 3} = \frac{8}{7} = \boxed{1\frac{1}{7}}$

2. Ex 2:  $3\frac{1}{4} \div 2\frac{3}{10} = \frac{13}{4} \div \frac{23}{10} = \frac{13}{4} \times \frac{10}{23} = \frac{130 \div 2}{92 \div 2} = \frac{65}{46} = \boxed{1\frac{19}{46}}$

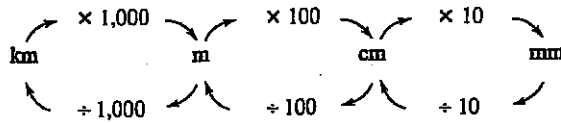
3. Ex. 3:  $4 \div \frac{1}{3} = \frac{4}{1} \div \frac{1}{3} = \frac{4}{1} \times \frac{3}{1} = \frac{4 \times 3}{1 \times 1} = \frac{12}{1} = \boxed{12}$

4. Ex. 4:  $2\frac{1}{2} \div 5 = \frac{5}{2} \div \frac{5}{1} = \frac{5}{2} \times \frac{1}{5} = \frac{5 \times 1}{2 \times 5} = \frac{5 \div 5}{10 \div 5} = \boxed{\frac{1}{2}}$

## Metric System Conversions

metric system conversion: we can rewrite one metric unit as another metric unit by multiplying or dividing by a power of 10 (10, 100, 1,000, etc.)

Multiply to change from larger units to smaller units.



Divide to change from smaller units to larger units.

Ex: 5 kilograms = \_\_\_ milligrams

900,000 centimeters = \_\_\_ kilometers

$$5 \text{ kilograms} \times 1,000 = 5,000 \text{ grams}$$

$$5,000 \text{ grams} \times 100 = 500,000 \text{ centigrams}$$

$$500,000 \text{ centigrams} \times 10 = \boxed{5,000,000 \text{ milligrams}}$$

$$900,000 \text{ centimeters} \div 100 = 9,000 \text{ meters}$$

$$9,000 \text{ meters} \div 1,000 = \boxed{9 \text{ kilometers}}$$

## Customary (English) System Conversions

customary system conversion: we can multiply or divide to change units in the customary system; multiply to change from larger units to smaller units and divide to change from smaller units to larger units

Table of Customary Conversions of Length

12 inches (in.) = 1 foot (ft)	5,280 feet = 1 mile (mi)
36 inches = 1 yard (yd)	1,760 yards = 1 mile
3 feet = 1 yard	

Ex: 4 feet 11 inches = \_\_\_ inches

42 feet = \_\_\_ yards

$$4 \text{ feet} \times 12 = 48 \text{ inches}$$

$$48 \text{ inches} + 11 = \boxed{59 \text{ inches}}$$

$$42 \text{ feet} \div 3 = \boxed{14 \text{ yards}}$$

$$\begin{array}{r} 14 \\ 3 \overline{)42} \\ \underline{-36} \\ 12 \\ \underline{-12} \\ \hline \end{array}$$