Fractions, Ratios, and Proportions
Work Sheets

The work sheets are grouped according to math skill. Each skill is then arranged in a sequence of work sheets that build from simple to complex. Choose the work sheets that best fit the student's need and will bring him up to the desired level.

Contents

Work Sheet	Title	Introduced	Page
	Fractions		
1.	Reading and Writing Fractions	Review from Level 200	1
2.	Numerator and Denominator	Math 303, Lesson 9	2
3.	Equal Fractions	Math 304, Lesson 3	3
4.	Ordering Fractions	Math 304, Lesson 11	4
5.	Mixed Numbers	Math 305, Lesson 6	5
6.	Fractions that Equal 1	Math 307, Lesson 1	6
7.	Finding Half of a Larger Number	Math 307, Lesson 3	7
8.	Finding a Fraction of a Number	Math 407, Lesson 7	8
9.	Proper and Improper Fractions	Math 402, Lesson 14	9
10.	Changing Mixed Numbers to Improper Fractions	Math 404, Lesson 1	10
11.	Making Equal Fractions	Math 405, Lesson 7	11
12.	Finding the Missing Numerator	Math 405, Lesson 12	12
13.	Finding the Fraction of a Number Mentally	Math 507, Lesson 8	13
14.	Changing Fractions to Percents	Math 507, Lesson 14	14
15.	Rounding Mixed Numbers to the Nearest Whole Number	Math 703, Lesson 12	15
	Adding/Subtracting (like denominators)		
16.	Adding and Subtracting Fractions Horizontally	Math 402, Lesson 4	16
17.	One Minus a Fraction	Math 406, Lesson 14	17
18.	Adding or Subtracting Mixed Numbers	Math 407, Lesson 8	18
19.	Subtracting a Mixed Number From a Whole Number	Math 503, Lesson 1	19
20.	Borrowing to Subtract Fractions	Math 503, Lesson 12	20
	Adding/Subtracting (unlike denominators)		
21.	Lowest Common Multiple	Math 408, Lesson 3	21
22.	A Quicker Way to Find LCM	Math 408, Lesson 8	22
23.	Using Common Denominators to Add or Subtract	Math 503, Lesson 2	23
24.	Finding the Lowest Common Denominator	Math 503, Lesson 12	24
25.	Changing Fractions to Common Denominators	Math 504, Lesson 1	25
26.	Finding the LCD Before Adding/Subtracting Fractions	Math 504, Lesson 8	26
27.	Borrowing to Subtract Mixed Numbers With LCD	Math 505, Lesson 12	27
	Multiplying		
28.	Multiplying Fractions	Math 505, Lesson 2	28
29.	Canceling Before Multiplying Fractions	Math 505, Lesson 6	29
30.	Multiplying Fractions, Mixed Numbers, and Whole Numbers	Math 506, Lesson 8	31
31.	Multiplying Mixed Numbers, Whole Numbers, and Fractions With More Than Two Factors	Math 603, Lesson 2	32
32.	Canceling Twice to Multiply Fractions	Math 603, Lesson 1	33

Dividing

33. Reciprocals . . . . . Math 507, Lesson 6 34
34. Dividing Fractions . . . . . Math 507, Lesson 12 35

Simplifying

35. Changing Improper Fractions to Whole or Mixed Numbers . . . . . Math 405, Lesson 4 36
36. Simplifying Fractions . . . . . Math 405, Lesson 6 37
37. Simplifying Mixed Numbers . . . . . Math 407, Lesson 14 38
38. Simplifying Fractions to Simplest Form . . . . . Math 406, Lesson 6 39

Decimals

39. Converting Fractions and Mixed Numbers to Decimals . . . . . Math 602, Lesson 6 41
40. Converting Decimals to Fractions and Mixed Numbers . . . . . Math 603, Lesson 6 42
41. Changing Fractions to Decimals on a Calculator . . . . . Math 605, Lesson 7 43
42. Using Decimal Equivalents to Compare Fractions . . . . . Math 607, Lesson 3 44

Ratio and Proportion

43. Ratios Compare Amounts . . . . . Math 406, Lesson 3 45
44. Ratios Compare Measurements . . . . . Math 406, Lesson 7 46
45. Three Ways to Write Ratios . . . . . Math 505, Lesson 9 47
46. Equivalent Ratios: Enlarging . . . . . Math 506, Lesson 6 48
47. Equivalent Ratios: Simplest Form . . . . . Math 506, Lesson 9 49
48. Writing Ratios as Percents . . . . . Math 604, Lesson 2 50
49. Proportions: Finding the Missing Term . . . . . Math 506, Lesson 12 51
50. Using Cross Products to Solve and Check Proportions . . . . . Math 507, Lesson 1 52
51. Setting Up Proportions . . . . . Math 507, Lesson 11 54
52. Using Proportions to Convert U.S. Measures . . . . . Math 602, Lesson 8 55
53. Solving Percents Using Proportions . . . . . Math 607, Lesson 12 56
54. Rates . . . . . Math 607, Lesson 18 58
55. Using Proportions to Convert Measures Between U.S. and Metric Measure . . . . . Math 703, Lesson 15 59
56. Converting Between Kilograms and Pounds . . . . . Math 705, Lesson 15 61
57. Converting Between Inches and Centimeters . . . . . Math 706, Lesson 15 62
58. Converting Between Meters and Yards . . . . . Math 707, Lesson 15 63

Work Sheet 19 **Math 503, Lesson 1**

Subtracting a Mixed Number From a Whole Number

You can not subtract a fraction from nothing.

$$\begin{array}{r} 8 \\ -\ 2\frac{3}{5} \\ \hline \end{array}$$

I cannot subtract $\frac{3}{5}$ from nothing. I must borrow from 8.

Cross out 8 and write 7.

$$\begin{array}{r} {}^{7}\not{8}\,\frac{5}{5} \\ -\ 2\frac{3}{5} \\ \hline \end{array}$$

You are subtracting fifths, so change the 1 you borrowed to $\frac{5}{5}$ and write it above the fraction.

$$\begin{array}{r} {}^{7}\not{8}\,\frac{5}{5} \\ -\ 2\frac{3}{5} \\ \hline \end{array}$$

Now you can subtract.

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

Borrow from the whole number before you subtract.

1. a. $3 - 2\frac{4}{5}$ **b.** $5 - 3\frac{7}{8}$ **c.** $6 - 1\frac{5}{9}$ **d.** $7 - 3\frac{3}{5}$

2. a. $8 - 4\frac{7}{8}$ **b.** $2 - 1\frac{5}{12}$ **c.** $6 - 4\frac{2}{7}$ **d.** $9 - 7\frac{5}{12}$

3. a. $8 - 3\frac{7}{12}$ **b.** $6 - 3\frac{1}{10}$ **c.** $7 - 2\frac{7}{10}$ **d.** $5 - 2\frac{5}{8}$

Borrowing to Subtract Fractions

When the top fraction is smaller than the bottom fraction in a subtraction problem, you must borrow.

You cannot subtract $\frac{4}{5}$ from $\frac{2}{5}$. Borrow 1 from 5.

Change the 1 to $\frac{5}{5}$ and add it to $\frac{2}{5}$.

The 5 becomes a 4 and the $\frac{2}{5}$ becomes $\frac{7}{5}$.

$\frac{2}{5} + \frac{5}{5} = \frac{7}{5}$

$$\begin{array}{r} {}^{4}\cancel{5}\,{}^{7}\tfrac{2}{5} \\ -\ 2\,\tfrac{4}{5} \\ \hline 2\,\tfrac{3}{5} \end{array}$$

Subtract. Borrow as needed. Give answers in simplest form.

	$7\frac{1}{12}$	$12\frac{3}{8}$	$4\frac{1}{7}$	$12\frac{1}{4}$
1. a.	$-\ 3\frac{11}{12}$	**b.** $-\ 6\frac{7}{8}$	**c.** $-\ 3\frac{2}{7}$	**d.** $-\ \frac{3}{4}$
	$7\frac{1}{5}$	$17\frac{1}{8}$	$8\frac{1}{6}$	$7\frac{7}{12}$
2. a.	$-\ 2\frac{3}{5}$	**b.** $-\ 8\frac{3}{8}$	**c.** $-\ 7\frac{5}{6}$	**d.** $-\ 6\frac{11}{12}$
	$14\frac{5}{16}$	$7\frac{1}{4}$	$3\frac{3}{8}$	$4\frac{1}{9}$
3. a.	$-\ 4\frac{7}{16}$	**b.** $-\ 5\frac{3}{4}$	**c.** $-\ \frac{7}{8}$	**d.** $-\ 1\frac{7}{9}$
	$8\frac{2}{7}$	$9\frac{3}{16}$	$7\frac{5}{12}$	$4\frac{1}{9}$
4. a.	$-\ 6\frac{5}{7}$	**b.** $-\ 8\frac{7}{16}$	**c.** $-\ 6\frac{7}{12}$	**d.** $-\ \frac{5}{9}$

Note: If student doesn't know how to simplify assign worksheets 36–38.

Multiplying Mixed Numbers, Whole Numbers, and Fractions With More Than Two Factors

When multiplying mixed numbers, whole numbers, and fractions, the first step is to rewrite the problem, changing mixed and whole numbers to improper fractions. You can cancel any denominator with any numerator. Then multiply all the numerators together and all the denominators together. If the answer is an improper fraction, change it back to a mixed number.

There are no mixed numbers or whole numbers. Pairs that cancel are 5 and 15, 4 and 8, and 7 and 7.

$$\frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{7}}}{\underset{3}{\cancel{15}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{7}}} = \frac{1}{6}$$

$$3\frac{1}{7} \times \frac{2}{3} \times 3\frac{1}{2}$$

Change all mixed numbers to improper fractions. Pairs that cancel are 22 and 2, and 7 and 7.

$$\frac{\overset{11}{\cancel{22}}}{\underset{1}{\cancel{7}}} \times \frac{2}{3} \times \frac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{2}}} = \frac{22}{3} = 7\frac{1}{3}$$

Solve. Cancel if possible.

1. a. $\frac{7}{12} \times 1\frac{2}{3} \times \frac{6}{7} =$ _____ **b.** $2 \times 2\frac{1}{2} \times 2\frac{1}{4} =$ _____ **c.** $\frac{1}{2} \times \frac{1}{4} \times \frac{2}{3} =$ _____

2. a. $1\frac{2}{9} \times 2\frac{1}{2} \times \frac{9}{10} =$ _____ **b.** $2\frac{1}{4} \times \frac{7}{20} \times 6\frac{2}{3} =$ _____ **c.** $\frac{2}{9} \times \frac{1}{5} \times \frac{5}{8} =$ _____

3. a. $16 \times \frac{1}{21} \times 1\frac{1}{2} =$ _____ **b.** $1\frac{2}{3} \times 3\frac{3}{4} \times 2\frac{2}{3} =$ _____ **c.** $\frac{1}{3} \times \frac{3}{4} \times \frac{1}{2} =$ _____

4. a. $\frac{3}{8} \times 1\frac{2}{3} \times 3 =$ _____ **b.** $3\frac{1}{3} \times 1\frac{2}{5} \times 12 =$ _____ **c.** $\frac{2}{3} \times \frac{1}{8} \times \frac{1}{4} =$ _____

Note: If student doesn't know how to simplify assign worksheets 36–38.

Using Proportions to Convert U.S. Measures

Proportions can be helpful in converting measures. They help us keep track of when we should multiply or divide.

60 feet is how many inches?

First write the conversion ratio. $\frac{1 \text{ foot}}{12 \text{ inches}}$

Then write the second ratio, keeping each unit (feet and inches) on the same level as the first ratio. The second ratio uses *n* for inches since we need to find inches.

$$\frac{1 \text{ foot}}{12 \text{ inches}} = \frac{60 \text{ feet}}{n \text{ inches}}$$

Solve. $12 \times 60 \div 1 = 720$.

60 feet is 720 inches.

336 hours is how many days?

$$\frac{1 \text{ day}}{24 \text{ hours}} = \frac{n \text{ days}}{336 \text{ hours}}$$

$1 \times 336 \div 24 = 14$.

336 hours is 14 days.

Often when you need to convert measures, you will know whether to divide or multiply. But if your answer does not seem sensible or if you get confused, setting up a proportion helps you stay on track. Proportions are especially helpful when you do more complicated conversions.

Set up a proportion to find each answer.

1. a. 180 in = _____ yd

Set up a proportion.

Solve cross products.

b. 4 yd = _____ ft

2. a. 112 oz = _____ lb

Set up a proportion.

Solve cross products.

b. 12 gal = _____ qt